

# Western Industry

December 1955

## BY-PRODUCT CONVEYOR →

dumps coke in stock pile  
¼ mile from plant site.  
Details on p. 24.

## CORROSION CURES

told by a noted Western  
engineer from his years  
of know-how . . . p. 21.

## POWER TRANSMISSION

An unusual installation  
of variable speed pump  
drives . . . p. 26.

## COOLING TOWER

is the key to no-waste  
water system . . . p. 28.



## 50 BEARING MANUALS — yours for the asking

The best manufacturer technical manuals in print today on bearing design, application and maintenance, yours free—first of a new WI special service series . . . **page 33**





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Clean with

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*Strong Point of any assembly*



## **Where the heat's on to lift bolts and nuts out of the ordinary**

**Y**ou won't see these spheroidizing furnaces in many bolt and nut plants. They call for a big investment of money. But to a company that wants to be sure of conditioning metal for the best bolt and nut possible, they're worth it.

In the photo above, you see R. M. Hubley setting up to anneal coils of wire rod to change its structure for the better. Next, he'll hoist the furnace at right, setting it down over the stacked coils. This special equipment makes it possible to accurately control the heating, cooling and the atmospheric conditions inside the housing.

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110th year

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December 1955

Vol. XX, No. 12

## ARTICLES

- Cures for corrosion's \$\$\$ diet.** . . . . . 21  
Tactical procedures, with specific examples of corrective measures, drawn from the years of know-how of a Western engineer.
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Belt rides on new type idler to carry coke from Union Oil's Santa Maria, Calif., refinery to a stock pile.
- Variable speed drives on pumps.** . . . . . 26  
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- New clamp stops metal tearing.** . . . . . 27  
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- No-waste water system.** . . . . . 28  
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- How to head off steam line repairs.** . . . . . 30  
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**SERVING ALL INDUSTRY IN THE NATION'S FASTEST GROWING REGION**



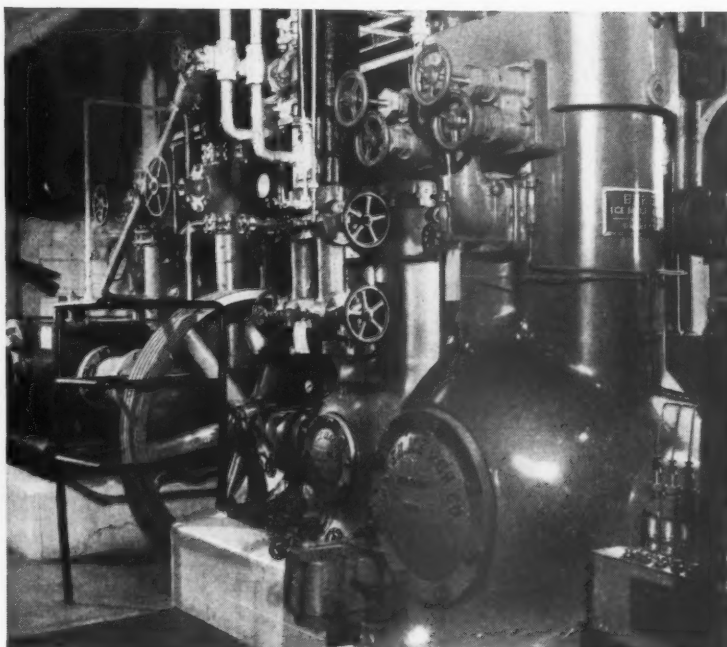
# Standard Engineer's Field Report

## CASE HISTORY

*Calol Multi-Machine Oil ICH*  
LUBRICANT

*Minute Maid Corporation*  
FIRM *Kent, Wash.*

## Compressor runs 10,000 hours without repairs or valve trouble of any kind!



THIS 10½x10½ BAKER (right) and five similar compressors refrigerate 2 deep-freeze rooms as well as 11 quick-freezers at Minute Maid Corporation's Kent, Washington, plant (see broccoli packaging line, above left). Down-time can mean a costly loss of stored food and lost production. By switching to Calol Multi-Machine Oil ICH, the company ended all previous trouble with sticking valves and carbon build-up, reduced wear to a negligible rate. One 8x8

compressor was inspected recently after running more than 12 hours a day for two years—10,000 hours—without trouble of any kind—only parts replaced were two wrist pins and bushings!



TRADEMARK "CALOL" REG. U. S. PAT. OFF.

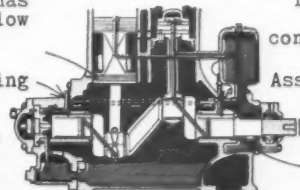
FOR EXPERT HELP on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative, or write to 225 Bush Street, San Francisco, Calif.

### Why Calol Multi-Machine Oil ICH reduces maintenance on bearings, pumps, compressors

Resists formation of deposits; has extremely low pour point

Separates rapidly from water and contaminants

Metal-wetting ability keeps oil on bearings under heaviest loads



Assures efficient seal of stuffing box glands

**STANDARD OIL COMPANY OF CALIFORNIA**







Launching of the *Seawolf*—Navy's second atomic submarine—official U. S. Navy Photo.

## New kind of power — with tried and tested control

No longer is atomic power a fantasy—everybody knows that. Witness Navy's two new submarines—both atomic-powered. The *Nautilus* already is with the fleet—the *Seawolf* shown here is under construction.

And on land, new atomic central power stations are under construction or being designed.

Splitting the atom was a big hurdle in nuclear power development. But equally challenging was the problem of flow control of the radioactive materials.

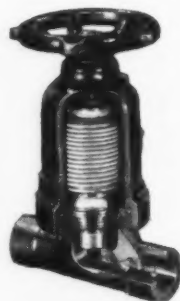
That Crane should have a big part in this flow control development was only natural. And natural, too, that Crane equipment should be on the

*Nautilus* and the *Seawolf*, as in the many atomic power projects soon to come.

For Crane's 100-year manufacturing experience is mainly in flow control—in the metallurgy and engineering of valves and fittings for all industries' piping needs. Quality first is traditional at Crane... production facilities have no equal.

Tried and tested for dependability... for durability... for value, Crane valves and fittings are the first choice of thrifty buyers everywhere.

Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers serving all areas.



Valve shown is typical of those supplied for Navy's atomic submarines. Crane makes valves and fittings for every piping need—in brass, iron, steel and corrosion-resistant alloys. Leadership in completeness of line and quality makes Crane...

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first choice  
for better piping  
materials**

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**WESTERN INDUSTRY — December 1955**





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**ARO**

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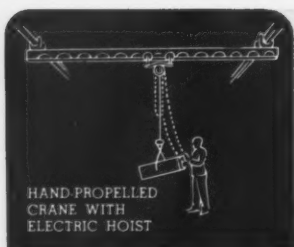
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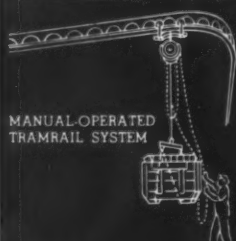
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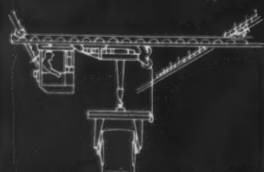




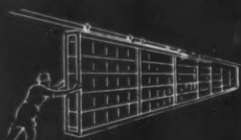
HAND PROPELLED  
CRANE WITH  
ELECTRIC HOIST



MANUAL-OPERATED  
TRAMRAIL SYSTEM



CAB-OPERATED TRAMRAIL CRANE  
WITH MOTOR-DRIVEN ROLL GRAB



HAND-PUSHED RACK CARRIERS



HAND-PROPELLED  
CRANE WITH  
CHAIN HOIST

#### KNOW THE ARCH

The round arch is an easy means of identifying Cleveland Tramrail. Only Cleveland Tramrail makes ARCH BEAM with true round arches. No other section has the most important feature of ARCH BEAM the raised wearing tread.

#### MILD STEEL BEAM

The beam is arched at regular intervals. It has same strength as similar solid beam.

#### COMPOUND SECTION

Made of two parts: wide flanged beam welded to standard Cleveland Tramrail rail.

#### HIGH CARBON RAIL

Especially rolled with flat raised treads of high carbon alloy steel. Minimum brinell hardness of 225.

#### REDUCES WEIGHT

Arches reduce weight without sacrifice of strength.

#### RAISED WEARING TREADS

Raised treads prevent rail peening and provide a wear factor not obtainable with any other single-piece rail. There are no separately mounted rails or wear treads to loosen and require maintenance.

#### SEVEN SIZES

ARCH BEAM is available in seven sizes (8" to 18" deep), all with same rail width, enabling carriers to travel between any pair of beams.

## Arch Beam . . .

### A SUPERIOR OVERHEAD TRACK

ARCH BEAM is recommended wherever loads to be handled are too heavy or spacing of supports too great for standard Cleveland Tramrail rail.

The development of ARCH BEAM track with regularly spaced openings in the beam was pioneered by Cleveland Tramrail. With millions of feet used for thousands of cranes, transfer bridges, runways and complete overhead track systems, both electrified and hand-propelled, ARCH BEAM has become a trade mark recognized everywhere by the true round arches, as a symbol of Cleveland Tramrail.



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BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

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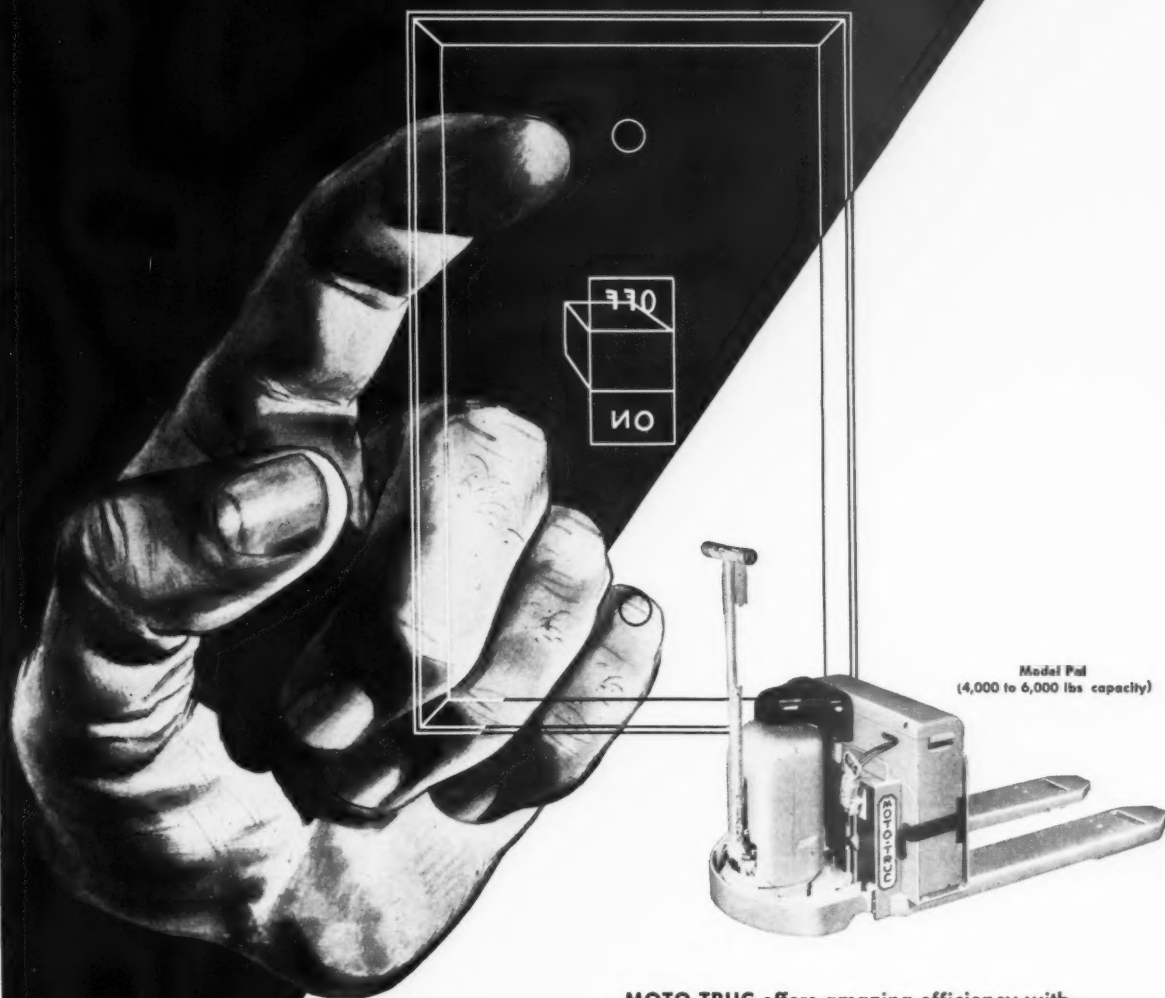
**CLEVELAND**  **TRAMRAIL**  
**OVERHEAD MATERIALS HANDLING EQUIPMENT**

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WESTERN INDUSTRY — December 1955



# MOTO-TRUC *Instant Power...*

*...like the "FLICK" of a light switch*



Model Pal  
(4,000 to 6,000 lbs capacity)



**The MOTO-TRUC Co**

Representatives in Principal Cities

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Pallet... Platform... Hi-Lift Trucks

The Originators of the Walkie and  
Small Rider Type Truck.

MOTO-TRUC offers amazing efficiency with **INSTANT ACTION!** (Two speeds, forward and reverse.)

This **INSTANT ACTION** transmits power to the drive wheel with a minimum of moving parts. MOTO-TRUC design "pays off" with less maintenance . . . and years of trouble free operation.

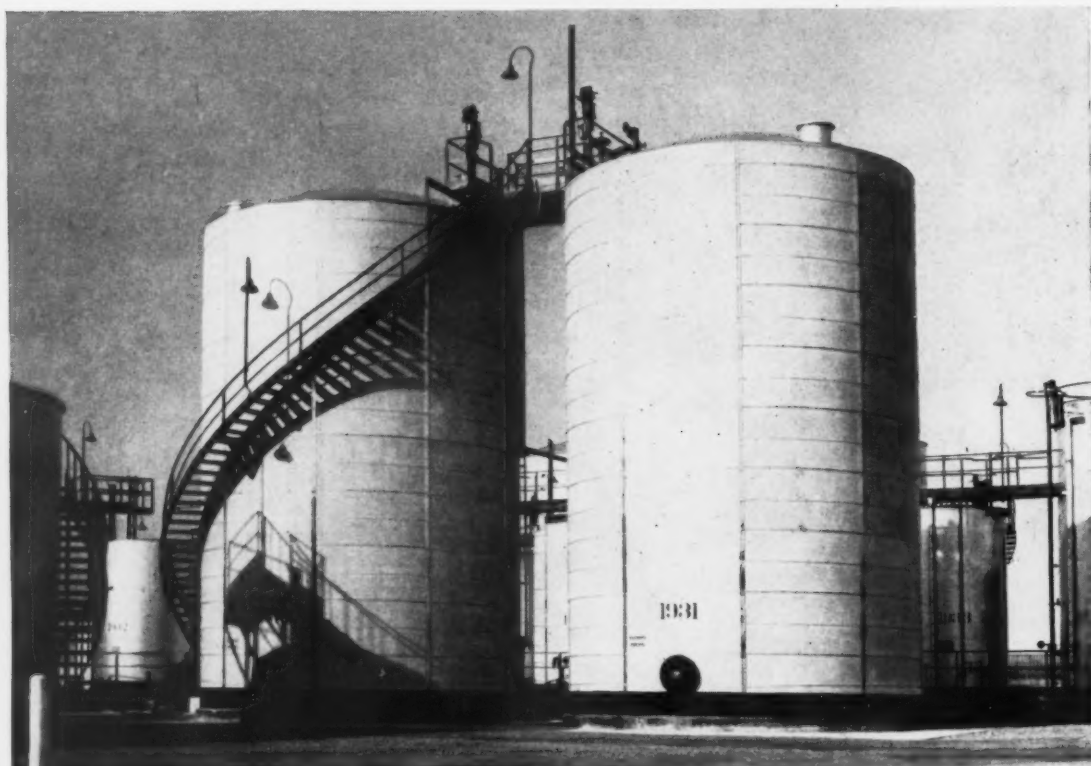
Remember . . . MOTO-TRUC *originated* the walkie and small rider type trucks . . . and **THERE'S A MOTO-TRUC FOR EVERY PURPOSE.** Send for Bulletin No. 53 covering the complete line.



if

# CORROSION

is the problem . . . .



## HORTON nickel clad tanks may be the answer

Whether you need nickel clad tanks, stainless clad or solid stainless . . . Chicago Bridge & Iron Company's expert design, fabrication and erection departments can help provide them. All four CB&I plants have facilities for stress-relieving, X-raying and pickling and painting fabricated materials by the Horton® phosphoric acid process.

The nickel clad tanks above are two of five we built for the Standard Oil Company of California's Richmond Refinery. They are 24 ft. in diameter by 36 ft. high.

When planning welded steel plate structures, corrosion-resistant or otherwise, write our nearest office for information, estimates or quotations.



## Chicago Bridge & Iron Company

Atlanta • Birmingham • Boston • Chicago • Cleveland • Detroit • Houston • Los Angeles • New York  
Philadelphia • Pittsburgh • Salt Lake City • San Francisco • Seattle • Tulsa  
Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PA.





## 7,000-lb. alloy steel cone forging no problem for National Supply

Designed for use in high pressure vessels, this huge alloy steel cone is one of several recently produced at National Supply's Torrance Plant. To overcome the handling problem created by its unusual shape and weight, National engineers readily developed a special mandrel to control the forging on the manipulator. The large hole in the small end of the cone—required for the mandrel—was closed by another forging operation and excess metal cut off by a torch. Then the cone was machined on a vertical boring mill. The result: a precision job, finished efficiently to the customer's specifications.

Big, specialized jobs which require smooth handling and precision work are typical of daily operations at National's Industrial Products Division. Complete facilities, engineering skill and experienced plant operators

are the vital ingredients that make National a logical source for your specialized steel products jobs. Why not plan a visit to Torrance to see for yourself how they can help you?



THE  
**NATIONAL  
SUPPLY**  
COMPANY

INDUSTRIAL PRODUCTS DIVISION

Torrance, California • Los Angeles Area

Ideal Pressed Steel Forgings • Billets and Large Bars  
Steel Castings and Special Machinery  
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Assembling • Welding • Testing

... for more details, circle No. 9 on Reader Service Postcard





# COMMENT

## Best wishes (and some suggestions) for your success in 1956

THROUGHOUT THE YEAR, WESTERN INDUSTRY reports for you those modern manufacturing methods proven under Western plant operating conditions to achieve significant cost reductions and more efficient and profitable production. Looking ahead to the fresh new year, now is an appropriate time to talk instead about you, about the challenges you face, and about ways you can guarantee your continuing adequacy as a plant operating executive.

One challenge appears today in startling and somewhat terrifying clarity. It is that you must keep up with rapid-fire advancements being made in industrial technology and methodology. In materials, where there is a swift broadening of the possibilities of the old, and more swift an introduction of the new. In equipment, where a multitude of new machinery is becoming available to do jobs faster and cheaper, now more than ever with less of the hand and more of the brain. In methods, where ahead-of-the-minute techniques you introduce today may actually within a few months be so outmoded as to endanger the competitive profitability of your operations.

Just what is your best course toward achieving the continuing confidence that you are not beginning slowly to lag behind in your fund of knowledge and degree of comprehension? There are basic methods, surely already well known to you. But, in the midst of your "crash" programs and the press of everyday responsibilities, are you by-passing some of them? For your reappraisal, here are five proven ways to keep yourself constantly among the best-informed:

1. Be an active member of technical society chapters. What you gain by interchanging ideas with men in your own and other industries completely justifies the few evenings per month spent in this idea-productive atmosphere.

2. Attend all possible trade shows and conferences. Manufacturers and distributors expend great efforts and

expense in exhibiting the latest equipment and demonstrating the latest methods. You gain ideas of inestimable value with only the investment of a few hours' time, and perhaps a few hundred miles of travel.

3. Take time to talk to distributors and factory representatives at every opportunity. These men, in addition to having a necessarily thorough knowledge of industrial products and applications, visit many plants where problems similar to yours have already been solved, and therefore can constantly bring you information about the newest plant operating techniques.

4. Be a constant visitor yourself at other manufacturing plants. Almost every plant, regardless of its end products, is doing jobs in ways that will suggest fresh approaches to your own problems.

5. Read much, but selectively. Helpful publications are pouring forth at an astonishing rate, from many sources. It is probable that you see only a small portion of those that would be of direct help to you, and that you read less. Take steps now to see that you receive a considerable abundance of these publications—manufacturer literature, business publications, government pamphlets, new editions of plant operating textbooks. Then, set aside definite times to look rapidly through all of it, and work hard at learning how to separate the wheat of significant information from the chaff of sheer abundance. Once seriously attempted, the task of wading through stacks of printed material to spend the majority of your reading time on material of most direct help to you becomes progressively easier and more productive.

If you conscientiously carry out all five of these basic ways to keep well informed during 1956, you can be certain that no other plant operating executive could possibly be making greater effort to fulfill this important responsibility of his position.

## A unique new service to help you get your bearings

ARE YOU getting your money's worth out of bearings? Do you, and can you ever, be adequately informed about the latest developments in this ubiquitous product found at the heart of every production operation?

To help you get up-to-date fast on bearings and other plant operating products, WESTERN INDUSTRY inaugurates this month a unique service. First installment of this service starts on page 33, where you'll find an impressive listing of 55 manufacturer manuals and booklets on just the one subject of bearings. All have been carefully selected for their value to you, and all are available to you free.

We sincerely believe this provides you with an unusual

opportunity to make sure you are getting best values in your bearing design, application and maintenance. And, we therefore recommend that you quickly check our concise abstracts to select those manuals that appear to offer information you want. The WESTERN INDUSTRY Reader Service Postcard bound into this issue provides you with a convenient means for obtaining your complete selection.

Next month, a section reviewing nearly 75 manuals on industrial fasteners will provide the second installment of this special service. Later issues will bring you listings of booklets covering a wide variety of plant operating equipment and products.





**E. D. Hudson, plant superintendent,  
Rancher's Cotton Oil, Fresno, Calif.**

***"Union's UNOBA Grease has solved a major problem  
for us—protecting bearings from linter dust."***

"Due to the material we process, 220 tons of cotton seed per day, cotton linter dust can be quite a problem where machinery's concerned. However, by using UNOBA Grease generally throughout the plant, we have practically eliminated trouble from this source.

"Take our Carver cotton linter machines—they're in operation 24 hours a day, seven days a week, 10 months out of the year. They have a total of 800 bearings which we automatically lubricate with UNOBA Grease, *and not one of these has failed in the past three years.* We think our preventive maintenance program is something to be proud of."

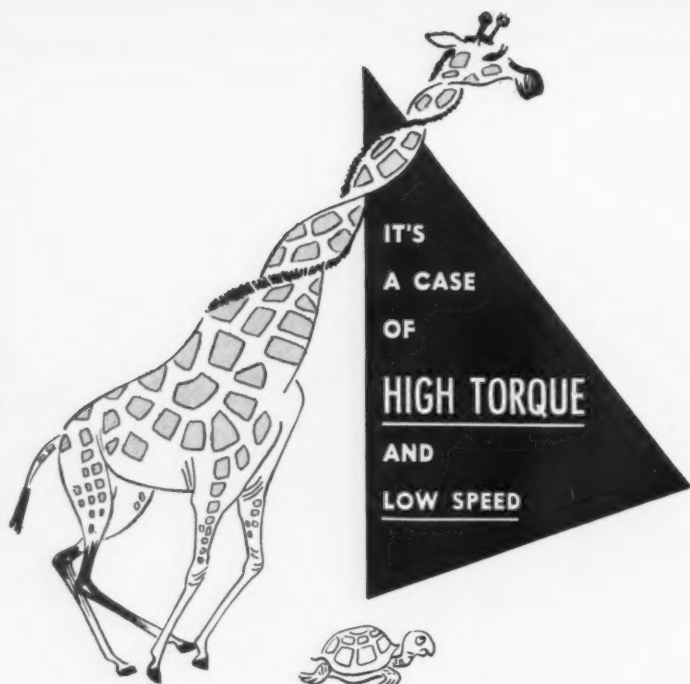
Mr. Hudson is right! And we're as pleased as he is about a record like that because it proves our point—UNOBA *affords the finest protection wherever dust conditions prevail.*

**UNION OIL COMPANY**  
OF CALIFORNIA

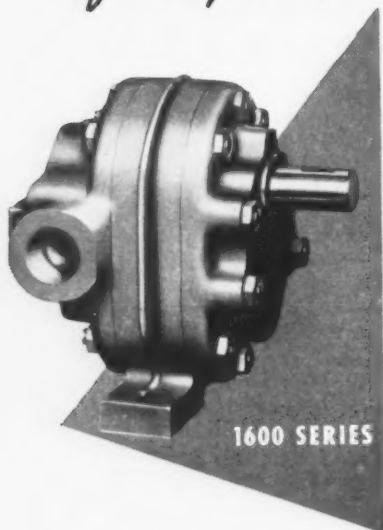
**76**

Los Angeles: Union Oil Bldg. • New York: 45 Rockefeller Plaza • Chicago: 1612 Bankers Bldg. • New Orleans: 644 National Bank of Commerce Bldg. • Atlanta: 401 Atlanta National Bldg. • Kansas City, Mo.: 612 W. 47th St. . . . for more details, circle No. 10 on Reader Service Postcard





*The new* **ROPER**  
**HYDRAULIC PUMP-MOTOR**  
*for Improved* **INDUSTRIAL SERVICE**



Designed by the same engineers who developed the famous Roper Rotary Pumps, the new Roper Hydraulic Pump-Motors operate on the same principle using two equal size, smooth-running gears in a precision-fitted case. These units offer low-speed and high-torque (much needed in the hydraulic field), and their versatility finds them well-suited to heavy-duty service within their operating range. They run equally well in either direction both as pumps or motors . . . they can be direct-connected without speed reducers, thus conserving space . . . they are easily installed, easy to operate, and are long on economy. Perhaps *you* have equipment that can be further improved with a Roper Hydraulic Pump-Motor. Send for all the facts today.

**PERFORMANCE CHARACTERISTICS**

Available in foot and flange mounted models. Recommended speed range on larger sizes is from 200 to 800 RPM with pressures to 800 PSI in this range, Roper units require from 7 to 40 GPM flow and will develop up to 11.5 HP output at maximum speed and pressure. Smaller sizes may be operated up to 1200 RPM and up to 800 PSI which will require a flow of 16 GPM to develop up to 5 HP.

**SEND FOR BULLETIN 22**

**GEO. D. ROPER CORPORATION**

Pacific Coast Office, Pump Division, 2011 S. Santa Fe Ave., Los Angeles 21, Cal.



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# LETTERS

## Need a suggestion system?

EDITOR—We are interested in obtaining the employee suggestion booklet mentioned in your article, "Sky limit suggestion system," on page 36 of the October issue. We assume this is published by AiResearch Manufacturing Co., but we do not know their address. Could you be of assistance?

WILLIAM R. KIMBALL, JR.  
 President, Kimball Manufacturing Co., San Francisco, Calif.

*(Certainly glad to help on any such request, and therefore we have forwarded this note directly to AiResearch at Phoenix, Ariz., for Mr. Kimball, whose firm does production molding of fibreglas products.—Ed.)*

## No SQC

EDITOR—Would you put me in touch with someone we might look to to secure help in installing a statistical quality control program in a structural clay products plant?

The enclosed literature will serve to illustrate the type of products we manufacture. At the present time, we have nothing of this sort, utilizing what might loosely be termed a "100% inspection" which falls far short of the indicated results.

President, a clay products plant

*(For obvious reasons, name of firm and writer of this letter has been withheld. We have suggested names of several experts on the subject and attendance at the monthly meetings of the local chapter of the American Society for Quality Control.—Ed.)*

## More IE interest

EDITOR—We are interested in having one or two copies of an article from your September 1955 issue, "Industrial engineers in smaller plants," which we found most interesting. Please accept our thanks for your courtesy.

F. O. NIXON  
 Manager, F. W. Stewart Corp.,  
 Los Angeles 15

*(WESTERN INDUSTRY for September carried the second in a series of two articles explaining the industrial engineer's function in small plants, Mr. Nixon. The July issue carried the first article and tearsheets of both are on their way to you.—Ed.)*





## "BRUTES FOR WORK"

Many of our customers, right in this area, tell us the XA-60 and ZA-80, 6000 and 8000 lb. capacity Hyster® Lift Trucks are "brutes" for work... because they go anywhere — inside, outside, through narrow aisles, over steep grades and rough ground — carrying a full load.

That puts these trucks in the real "work horse" class — big enough to do your outside jobs, yet not too big to work inside. With less overall width and shorter over-all length, the XA-60 and ZA-80, (with balanced weight distribution on pneumatic tires) allow you greater maneuverability and versatility in day-to-day jobs.

Why not call us today? As Hyster representatives in this area, we will be glad to show you how the *right* truck selected from one of the most complete lines of materials handling equipment on wheels today (1,000 to 30,000 lbs. capacity) can make a tremendous difference in your profit picture.



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RAYmond 3-6255

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# *NEW* MONORAIL CRANE

*offers many  
advantages*



For up and over handling this new American MonoRail Crane offers you the following advantages:

- up to 10 ton capacity
- meets low headroom conditions
- extra store room
- carrier service beyond craneway
- fingertip control from floor
- all movement power operated
- low maintenance cost

These are but a few reasons why you should call an experienced MonoRail engineer to help you with your handling problems.



AMERICAN

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HANDLING  
EQUIPMENT

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"Up-and-Over" is the title of our 16-mm sound film showing how MonoRail solves many tough handling problems at low cost. Please allow us three weeks to schedule a showing for you.

... for more details, circle No. 13 on Reader Service Postcard





## Christmas in September?

For the 13 fine young men and women pictured on this page it *was* Christmas in September, for they entered college last fall on scholarships you—our customers—helped provide.

Each year, Consolidated Freightways endows an annual college scholarship program in lieu of Christmas remembrances to our customers. A Scholarship Board of business and education leaders selects the outstanding applicants from the 11 western states in which CF operates. Each winner receives a \$500 scholarship. If the college to be attended is not tax supported, we

contribute an additional \$250 to the college. This year there were six of these.

CF is in business to provide superior motor freight service, not to award scholarships. However, we do think this program is another example of the "extra" service a good carrier can perform.

On behalf of this year's scholarship winners, and the 33 others who have had their Christmas in September since 1951, we say—"Thanks for everything, and a Very Merry Christmas."

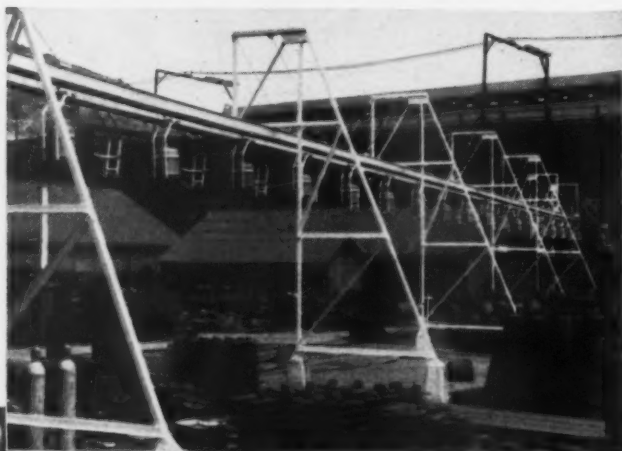


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# Automation...

## A New Word for an Old Idea



This trolley conveyor system with completely automatic receive and discharge stations, has been in the customers service for nearly 20 years, handling air brake reservoirs from foundry to machine shop.

The Engineers in the Conveyor Industry have been working at **Continuous Flow Material Handling** for a long time. The first Mathews equipment, for example, was built over 50 years ago, and although comparatively simple, was applied to do exactly what is expected of today's highly special conveying machinery—to help manufacturers produce more, at less cost.

Call it Automation, Continuous Flow, Technocracy—call it what you will. The results are the same—**more good things for a greater number of people.**

Whatever your product—whether you measure its weight in pounds or tons—if it must be handled, there are Mathews Conveyers to do the job efficiently.



**MATHEWS CONVEYER COMPANY WEST COAST  
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## CALENDAR OF MEETINGS

DEC. 28-29—Northwest Scientific Assoc., Davenport Hotel, Spokane, Wash. Contact Father Timothy O'Leary, c/o Spokane Chamber of Commerce, or phone EM-1571.

1956

JAN. 5-7—Northwest Cannery Assoc., 42d annual convention, Multnomah Hotel, Portland, Ore. Contact C. R. Tulley, NCA, Board of Trade Building, Portland 4.

JAN. 8-10—Northwest Frozen Foods Assoc., convention, Multnomah Hotel, Portland, Ore. Contact Assoc. headquarters, Title and Trust Bldg., Portland 4.

JAN. 18—Western Labor Management Relations Conference, Fairmont Hotel, San Francisco. U. S. and California State Chambers of Commerce, sponsors. Contact James D. Gofourth, Calif. State C. of C., 350 Bush St., San Francisco.

JAN. 24-27—American Management Assoc., general management conference, Fairmont Hotel, San Francisco. Contact Assoc. headquarters, 330 W. 42nd St., New York.

FEB. 2-3—Manufacturing Section, Governor's Industrial Safety Conference, Fairmont Hotel, San Francisco. Contact Michael Flagg, editor, California Safety News, State Department of Industrial Relations, 965 Mission St., San Francisco.

FEB. 3-4—8th Annual Industrial Engineering Institute, sponsored by University of California, Berkeley and Los Angeles campuses (simultaneous sessions). Contact Department of Conferences, Univ. of Calif., Los Angeles 24 or Berkeley 4.

MAR. 18-21—American Society of Mechanical Engineers, spring meeting, Multnomah Hotel, Portland, Ore. Contact ASME headquarters, 29 W. 39th St., New York 18.

MAR. 22-23—Annual spring conference of engineering and operating sections, Pacific Coast Electrical Assoc., Sheraton-Palace Hotel, San Francisco. Contact E. F. Perkins, PCEA, 681 Market St., San Francisco.

MAR. 26-28—Intermountain Logging Conference, Davenport Hotel, Spokane, Wash. Contact Charles Keim, Bigfork, Mont.

MAR. 27-APR. 2—Society of the Plastics Industry, 13th annual Pacific Coast Section Conference, St. Francis Hotel, San Francisco, and SS. "Lurline" to Honolulu. Contact Society headquarters, 67 W. 44th St., New York 36.

APR. 5-7—8th Biennial Electrical Industry Show, sponsored by Electrical Maintenance Engineers Assoc., Shrine Exposition Hall, Los Angeles. Contact Show headquarters, 3443 So. Hill St., Los Angeles 7.

... for more details, circle No. 15 on Reader Service Postcard





J-M 85% Magnesia is lightweight . . . easy for workmen to install half-sections on this 10" steam line. Insulation work at the Grace Chemical plant was performed by Young Sales Corporation of St. Louis. Engineering and construction was directed by Foster Wheeler Corporation of New York.

## Your Btu's and dollars go further when you specify **Johns-Manville 85% Magnesia**

...the choice of insulation engineers  
at Grace Chemical's new Memphis plant

INDUSTRY'S LONG-TIME standard for temperatures to 600F is still your best insulation buy. For J-M 85% Magnesia provides high insulating value, easy application, long life, initial low cost and minimum maintenance. That's why insulation engineers consistently specify J-M 85% Magnesia for modern installations like Grace Chemical's new anhydrous ammonia-urea plant. That's why it will pay you to specify J-M 85% Magnesia for your new plant or modernization program.

To assure you maximum value from your insulation dollar, Johns-Manville gives you complete drawing-board-to-job-site service. You get expert recommendations by the world's most experienced insulation engineers . . . plus expert installation by authorized J-M Insulation Contractors. Write today for further information on J-M 85% Magnesia and Johns-Manville's unmatched facilities to solve your insulation problems. Address Johns-Manville Box 60, New York 16, N.Y. In Canada, Port Credit, Ontario.



J-M 85% Magnesia also comes in block form. Here you see it being applied to a vertical drum at a New Jersey petroleum refinery.



**Johns-Manville** *first-in* **INSULATION**  
MATERIALS • ENGINEERING • APPLICATION





**or solid**

**a steel tube or bar  
for every purpose**



#### **TUBING: SEAMLESS AND WELDED**

Whatever your tubing requirement—whatever kind and quantity you need—you can get quick delivery of a quality product with a single call to Ryerson.

That's because Ryerson stocks are the nation's largest, including more types and sizes, more tonnage, than any other source. And Ryerson service facilities are unequalled, too.

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In stock: Cold drawn and hot rolled seamless mechanical tubing, hot and cold rolled welded tubing, hydraulic and cylinder tubing, structural tubing, etc.

#### **COLD FINISHED BARS**

Careful handling, accurate cutting, vigilant inspection—these are just three of many ways in which Ryerson assures you of the highest quality in cold finished bars.

Stored in temperature-controlled rooms, spark-tested to guard against mixed steels, Ryerson cold finished bar stocks include rounds, squares, hex's, flats—screw steel, accuracy stock, turned, ground and polished shafting, Ledloy for fastest machining—everything you need. And even the hard-to-get intermediate sizes are on hand.

To help you select the best cold finished bar for each application, we have just published a simplified guide showing the comparative strength, cost, machinability, workability, etc. of all commonly used types. Write for your copy and call Ryerson when you need high quality cold finished bars.

## **RYERSON STEEL**

In stock: Bars, structurals, plates, sheets, tubing, alloy and stainless steel, reinforcing bars, machinery & tools, etc.

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... for more details, circle No. 17 on Reader Service Postcard

**WESTERN INDUSTRY — December 1955**





To help you avoid losses like this pitting of an exchanger shell during shut-down, here are . . .

## Cures for corrosion's \$\$\$ diet

*Tactical procedures, with specific examples of corrective measures, drawn from the years of know-how of a Western engineer.*

**C**ORROSION, a formidable enemy to all of us, has time and all the physical laws on its side in a constant war to return materials from the forms we use them back to their natural states. Fortunately, the fact that corrosion frequently follows identifiable mechanisms is a vulnerable spot in its armor.

Our most effective counterattacks to this enemy are knowledge and experience—knowledge to decipher the ways and means in which corrosion occurs, and experience to aid us in evaluating the effectiveness of our countermeasures. Reference material

is a good start toward gaining such knowledge. See next page for some suggested texts. As an example, the remedies available to combat so-called "caustic embrittlement" are of questionable use in a case of pump cavitation. If we applied the conventional embrittlement remedies—stress relief, changes of material and environment—we would not be likely to do much to eliminate the cavitation in our pump body. We might better check the design and particularly the flow condition.

Often, we cannot pinpoint what occurs with assurance. Two recent in-

stances where some steel pipe was said to have broken like glass at the threads on disassembly, with a minimum strain reported prior to breaking, are good examples of this.

The fractures were crystalline with no evidence of ductility. Investigation developed that these pipes were below freezing when they broke.

This may be a case where simple lack of strength in the root of the thread may be involved. However, the possibility of the steel having unfavorable transition temperature characteristics cannot be neglected. We proposed that no work be done on pipe which was below 40 deg. F. because we could not consider full replacement with pipe of proper low temperature characteristics. Admittedly, we simply fenced our enemy, but these were chlorine lines and every precaution was necessarily exercised.

### **SULFURIC ACID ATTACKS LEAD-LINED STEEL PIPE**

A case from another plant involved sulfuric acid attack on lead-lined steel pipe. The remedy applied was the use of Type No. 316 ELC stainless pipe. In lieu of further evidence, it is quite

#### **AUTHOR OF THIS ARTICLE**



**GEORGE C.  
PUCKETT**

Materials Engineer,  
Dow Chemical Co.,  
Pittsburg, Calif.

**Mr. Puckett is a down-to-earth expert on causes and cures for corrosion under Western operating conditions. We know, having heard him answer a hundred specific questions after a talk at this year's Plant & Maintenance Show conference in L. A. And, that's why Western Industry's editors asked him to distill his practical wisdom on the subject into this article.**



possible that the straight 302 or 304 would have been cheaper. Application of Type No. 316 ELC stainless pipe is most successful in chloride-containing streams and in cases involving heat zone attack in welds.

Granted, it is not always worthwhile on occasional problems to go to the expense of positive proof. This is sometimes true in the minor problem which may involve obscure metallurgical features. If the problem is great, any reasonable expense should be considered warranted to determine its exact nature.

#### **EXPERIENCE — A MAJOR WEAPON**

Next major weapon in the continued war is that of experience—both our own and others'. The most effective method of compiling our own experience is a complete set of records on equipment in our own plants. Supplemented by periodic inspections, and liaison with engineering and operating departments, records almost always provide a complete set of clues to corrosion problems.

We have found that these records are best centralized in the corrosion department as the interaction between operations may be more critically followed. The records must be kept alive and all departments must cooperate in bringing corrosion problems to the attention of the corrosion engineer.

Full historical data is a good means of proper assessment of long-term remedies. As an example, we are quite concerned with evaluation of rubber linings in hydrochloric acid tanks, of which we have many. We have records for the past 15 years on the tanks, which puts us in a position to make decisions between competitive products when the time comes to reline.

Another case occurred in one of our departments. Valve replacements were costing as much as \$500 a month. A record system was set up and the repeaters were clearly apparent in their full detail. This department seldom runs a monthly bill in excess of \$150 for valves now.

#### **WATER CORROSION — NUMBER ONE ENEMY**

Water corrosion probably accounts for a sizable portion of the nation's corrosion dollar. The effect of dissolved oxygen and chloride ion in water is well known. We experience all of its ramifications—tuberculation, fouling, high pitting factors, and non-protective oxide scales.

The effects are amplified in exchangers due to the need for clean surfaces and high transfer rates. This results in frequent cleaning and little

opportunity to settle down to the slow diffusion controlled type corrosion experienced in service piping.

We are successfully using several major preventive measures for water corrosion. The first of these is the mechanical deaeration of a 5,000 gpm., once-through supply which is preferentially routed to plants having complex heat exchange equipment.

We have made an extensive review and comparison of 15 years' experience with steel tubes with and without deaerated water. From this, we have obtained a very useful factor in estimating service life—the tube wall thickness divided by the months of service. It is a useful combination of the conventional corrosion rate and the pitting factor in which neither component is actually known. We call this mils penetration per month (mPpm). We have found that with non-deaerated water and steel tubes this rate is five mils per month and with deaerated supply it is less than one mil.

**One of the best ways to acquire knowledge of the forms of corrosion is to refer to the list used by the National Assoc. of Corrosion Engineers in indexing characteristic corrosion phenomena. It is comprised of seven main divisions with over 75 subdivisions.**

**Using this listing and supplementing it with detailed study of corrosion in such books as Uhlig's "Corrosion Handbook" and Speller's "Corrosion—Causes and Prevention" offers a fair start to understanding corrosion mechanisms.**

Another measure in alleviating water attack is the use of corrosion-resistant materials. We have many installations with 70-30 copper-nickel tubes. This alloy has proven effective on the shell side of exchangers where moisture and small amounts of hydrochloric acid are present, as well as being excellent for the water side.

We also use steel over Admiralty duplex tubes with the steel on the shell side exposed to chlorine or ammonia. Stainless steels are also required for some shell side corrosives. Both of these alloys are effective against water side attack.

In another case, one may know the time of failure and still continue to use steel tubes. This usually occurs if three conditions are present: the units are small and have adequate installed

spares; they can cause no operating trouble from tube leaks; and they have been determined to have very low retubing costs. This combination of circumstances does not happen very often.

Pure economics, however, sometimes dictates steel tubes, even though you know when failure will occur and how much maintenance will be involved. This situation arises when the "pay-out" time is too long to warrant the use of resistant materials. Such a conclusion requires much study and forecasting. Another common remedy is closed systems.

#### **USE STEEL TO FIGHT CAUSTIC CORROSION**

In the processes using caustic soda, first choice of material is always steel. Points to watch when using steel line and tanks with caustic soda are contaminants with the caustic, requirements for low iron product, and high stresses.

Highly stressed steels should not be used above 30% concentration and/or 120 deg. F. Nickel, copper, monel, and stainless are useful materials where steel is unsatisfactory. Copper and its alloys tend to contaminate soap products and stainless may be subjected to stress corrosion in the presence of chlorides.

Chemistry teaches us that we might expect some alkaline corrosion with steel. However, in the ordinary use of caustic, we frequently find that some other factor may be causing the trouble. These possibilities should be exhausted before assuming the problem is caused by alkaline corrosion.

#### **CATHODIC PROTECTION — GOOD IN SOME CASES**

A frequent question in regard to cathodic protection involves protection in the dry state, which you cannot do. Another involves short circuiting of your system, and "Why not use alternating current?" is a common question.

The basic fundamentals of cathodic protection are:

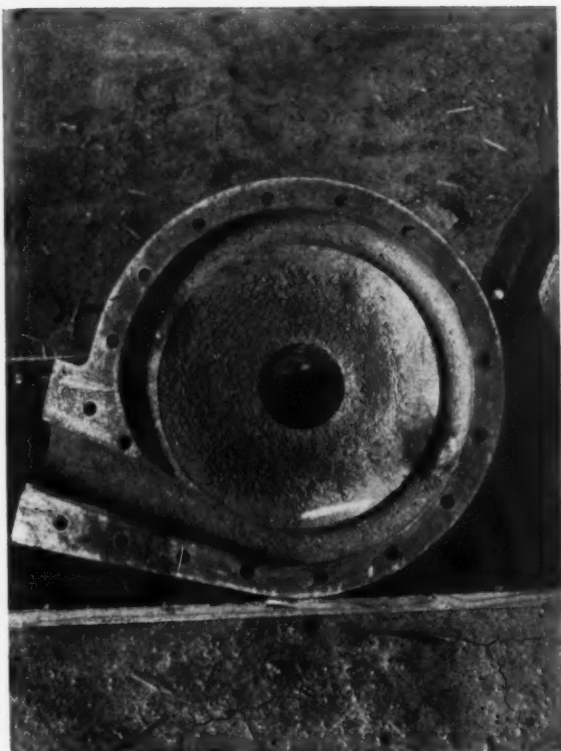
1. A complete electrical circuit is necessary requiring an external path, usually afforded by the structure, and an internal path of ionic nature, generally found in water solutions or soil moisture.

2. A uni-directional driving voltage is required—either from sacrificial anode material or from rectifier sources.

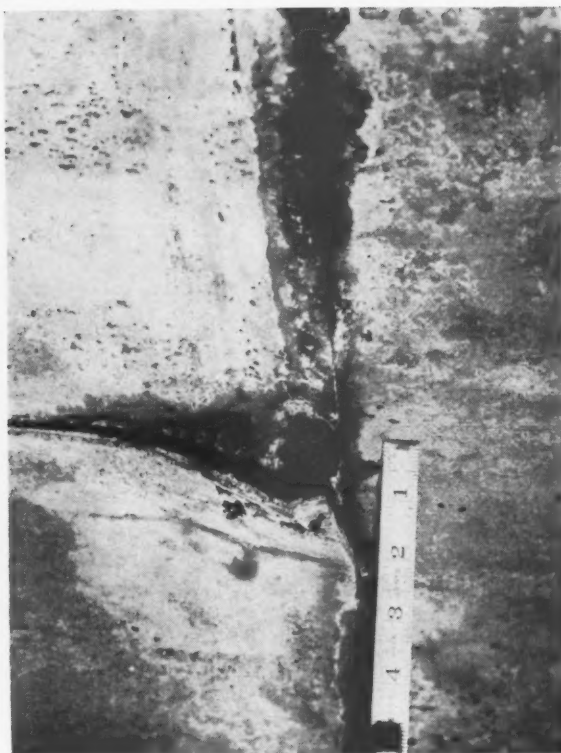
3. Carefully annotated records are a "must." Cathodic protection is not something you can install and forget.

If these principles are never forgotten, a good start is made in apply-





**CAVITATION** took place in these Hastelloy pumps which were in hydrochloric acid service.



**CREVICE TYPE ATTACK** developed at the seams of this 25-year-old lap welded tank.

ing this very effective preventive remedy. A particular exception in the many applications in this fruitful field is protection of small steel water piping, which so far has only been successfully accomplished by metallizing.

Here are a few miscellaneous applications which portray the extent of the use of cathodic protection:

1. Effective protection of underground pipe, sheet piling, off-shore structures, flumes, intake screens, underground footings, and tankage.

2. One of our installations is in a sea water flume passing 250,000 gpm. which has been under protection for ten years.

3. A tank problem was solved by use of platinum wire anodes with a rectifier system. This is unusual but effective.

4. A pipe problem requiring unusually good current distribution and density was solved by running magnesium ribbon through a paralleling sewer line and making connections through the manholes. This eliminated need for expensive excavation.

Any time you have a leak in underground pipe it is very wise to consider the installation of an anode at the location. This is standard practice in our plant and we have not had a repeater.

In pipeline work, place anodes away from the buried metal structures at-

tached to the pipe. We had an installation of about 3,000 ft. of well coated line and were getting ample protective voltage but were recording extremely high current drains. It was found that the original installation had inadvertently placed the anodes close to heavily reinforced concrete anchors. Result was a very effective—and completely unnecessary—protection of the rerod.

It is the multi-pass 12 to 30 in. diameter range that seems to be neglected. We have many successful installations of this type using rod or bar-type magnesium in each pass chamber. Some ingenuity must be used to install bars so as not to restrict flow, and so that sufficient material is available to last at least six months. If you do install bar anodes, put a sheet of rubber under them to afford a better current distribution. This avoids the excessive concentration of current and unnecessary over-protection in the immediate vicinity of the anode.

#### **SOLVENT COATINGS— NOT PERFECT, BUT . . .**

None of the solvent coatings for immersion applications are perfect. Access for maintenance and periods between availability frequently dictate the type of coating you may use, and

should be carefully considered in the beginning.

Detailed procedures for proper application as well as personal supervision by most formulators right in your plant are always available. You should never go wrong in applying the coating. Once you have determined the requirements, however, be sure the applicator also understands the process.

It is necessary to be very careful when considering lining over corroded surfaces. You may not be able to blast the surface sufficiently clean to get the most for your coating money. Unremoved corrosion products may lift the lining, and thin linings may not bridge the pits properly. This is a problem we all meet sometimes, and mostly on tanks.

We have records of over five years in 50% caustic tank cars using a three-system vinyl. One of our divisions uses this and other materials in 73% with equally good service. Regular inspections and small repairs keep these linings in top condition.

In saturated sodium and potassium chloride solutions, at temperatures up to 70 deg. C., the same vinyl system has given excellent service. Some repair was required after three years in sodium chloride service, but to date the potassium chloride tank has not been touched.





**STARTING IN THE COKE PIT** at Union Oil's Santa Maria refinery, first section of bulk conveyor climbs to a weighing station and then dumps coke into hopper which loads onto second conveyor section.

## By-products conveyed $\frac{1}{4}$ mi.

*... with belt riding on a new type idler to carry coke from Union Oil's Santa Maria, Calif., refinery to stock pile.*

**S**OME of the latest principles and equipment in the field of bulk material handling are exemplified by the new petroleum coke conveyor at Union Oil's Santa Maria, Calif., refinery. Constructed by the Bechtel Corp. of San Francisco, the refinery commenced operation in March 1955.

Petroleum coke is a by-product of the operation and is produced at the rate of 600 tons a day. It is carried a distance of about 1,177 ft. by a U. S. Rubber trough-type conveyor 30 in. wide. Due to a change of direction involved, the conveyor is in two sections. Both are designed to carry the coke at a speed of 250 fpm.

The first section is 136 ft. long. It starts in the coke pit where the warm (100-120 deg. F.) material drops 4 ft. from a bin onto the conveyor. Three impact idlers absorb the shock of this drop. They are spaced at 6-ft. intervals. Side plates extend on either side of the first  $6\frac{1}{2}$  ft. of the belt to prevent spillage. The conveyor climbs to ground level at a 10% elevation.

The remainder of the belt's travel is on an idler which is comparatively

new to the West, the Joy "Limberoller." Although test installations have been made in Western plants, this is the first complete conveyor to be installed using this new type idler.

### **IDLERS FLEX WITH LOAD CHANGE**

Spaced 6 ft. apart, the idlers consist of a series of pressure-molded neoprene disks, molded to a neoprene-sheathed, flexible steel cable. Each roller, or disk, is  $1\frac{5}{8}$  in. long and 3 in. in diameter. There are 14 on each idler—four about  $\frac{3}{8}$  in. apart at either end and six spaced between them at about  $1\frac{3}{8}$ -in. intervals.

The cable ends turn within a double roll ball bearing at each end mounted by clips which are fastened to the conveyor trusses. These bearings, through the use of a clip-type mount, can be replaced without stopping the motion of the conveyor. An interesting feature of the Limberoller is the reduction of bearings required, since each roller is welded to the cable, which turns within the two end bearings, rather than turning on it.

The neoprene disks flex to conform to the load and return to natural shape when not under load. The flexing action works dirt out of the disks, providing a self-cleaning feature.

The take-up roller for the conveyor's first section is located at the loading point. It can move forward and backward to allow for weight changes. Tension is maintained by a cement block weight connected to the take-up roller by steel cable.

### **BELT RETURNS FLAT**

The belt returns flat, riding on idlers spaced at 12-ft. intervals. As it passes over the take-up roller it becomes trough shaped as it fits itself to the impact rollers. This trough shape is maintained until it reaches the drive roller at the other end of the first section. It passes over a scale which weighs the coke prior to reaching the drive roller and dumping point.

Drive for the first section is comprised of a 10-hp. electric motor and a Dodge Torque-Arm for speed reduction.





**FOLLOWING GROUND CONTOUR**, the 1,041-ft. second length of the coke conveyor is driven by a 15-hp. motor coupled with a Dodge Torque-Arm located at the dump end of the belt.

The coke dumps into a bin located over the second length of conveyor as the belt passes over the flat drive roller. Wipers located near the drive roller clean the belt of clinging materials. Plows located near the take-up roller clean the belt further.

Traveling at an angle to the first length, the second section of the conveyor is 1,041 ft. long, but operates much the same as the first length. Power system consists of a 15-hp. motor and another Dodge Torque-Arm speed reducer. Impact rollers absorb the shock of the coke dropping onto the conveyor from the second bin. Then the new-type idlers take over. The conveyor follows the contour of the ground to a point 120 ft. from the dump end. At this point, a 10% elevation carries the coke to the dumping point where it falls and piles up. Catwalk has been installed along this elevation to facilitate maintenance of the conveyor.

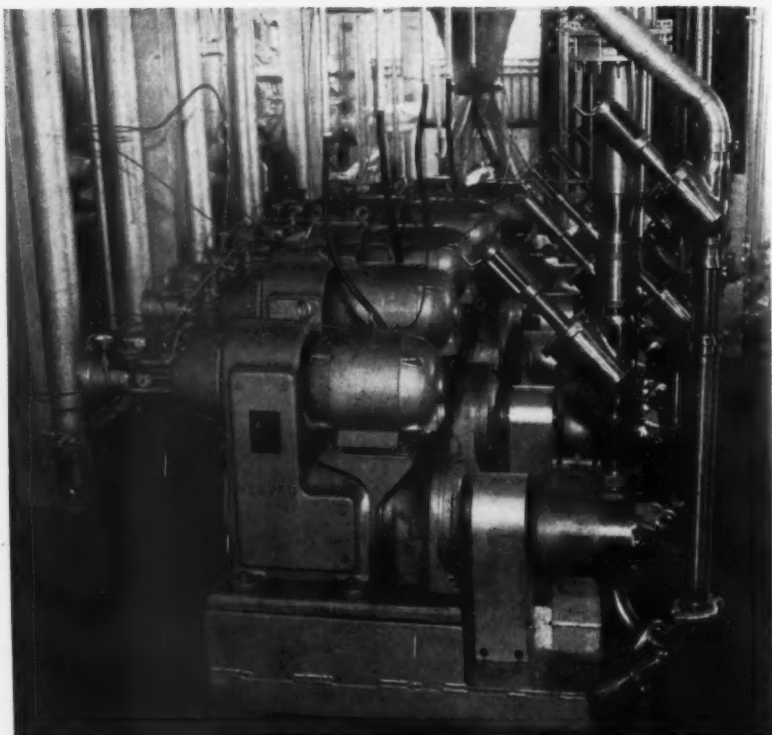
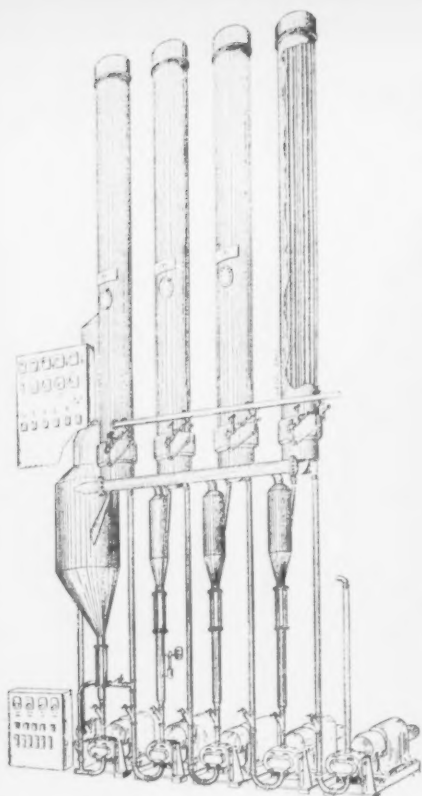
#### **CEMENT WEIGHT MAINTAINS BELT TENSION**

The take-up roller on the second length of the conveyor is somewhat different from that for the first section. The belt is directed down shortly after it passes over the drive roller at the final dump point. It passes around the take-up roller, which moves up and down corresponding to the weight being carried, and then goes back up to the return elevation rollers. A cement weight suspended from the take-up roller maintains tension on the belt as weight of load varies.



**END OF THE CONVEYOR** climbs at a 10% grade to a point where coke is dumped on the stock pile. Tension is maintained on the second length of the conveyor by passing the belt around a take-up roller from which a cement weight is suspended.





Short-time evaporator system with instrument-controlled power transmission set-up depends on . . .

## Variable speed drives on pumps



**PRECISE FLOW CONTROL** of fruit pulp passing through heat exchangers is maintained by these Taylor differential pressure controllers.

*Flow control of the fruit pulp through heat exchangers is essential to good taste and high quality of concentrated food products. Here's how it is obtained with instrument-controlled variable speed drives at two Western packing plants.*

**E**VAPORATING the natural waters from fruits to produce fruit concentrates has reduced the cost of packing and shipping fruits greatly. However, the process of evaporation is not so simple as it would seem. If handled improperly, the natural taste of the fruit involved is lost. So, the problem becomes one of producing a quality product by economical means.

A short-time, single pass evaporation system is meeting this problem for both Thornton Canning Co., Thorn-



ton, Calif., and Mor-Pak Preserving Corp. in Stockton, Calif. Designed by the author of this article, the comparatively new system involves four stages of heat exchangers.

So far, the unit has successfully produced tomato, apricot, and peach concentrate. The fruit is reduced to pulp form prior to entering the evaporation system. Pulp is pumped into each of the four stages by Waukesha double impeller type pumps which are driven by Reeves Auto-Pneumatic Control variable speed drives.

The auto-pneumatic control is comprised of a valve positioner and a pneumatic piston that is connected to the speed shifting mechanism of the variable speed drive. Change in the piston automatically adjusts the out-

#### AUTHOR OF THIS ARTICLE

... and inventor of this fruit concentration system is Frank A. Bellato, consulting mechanical engineer, Stockton, Calif. Mr. Bellato has for a number of years worked closely with the canning-packing industry and is close to its operational and production problems.

put speed of the drive.

In order that the drive might be fitted to automatic processes such as this one, a cam control and positioner combination is used to control speeds in proportion to instrument air pressure. In this manner, the amount

of speed increase per minimum unit is minimized and speed surges are avoided. Also, speed may be adjusted in smaller degrees.

As the waters are evaporated from the pulp, the material decreases in volume and the drive speed must be compensated accordingly. This compensation of speed is the key to the quality of the end product. For the three fruits being processed, speeds ranging from 30 to 180 rpm. are required.

The speed of each of the five drives involved is controlled automatically by Taylor differential pressure controllers. Once set, the instruments maintain pumping speeds according to the rate of reduction in volume of the pulp.

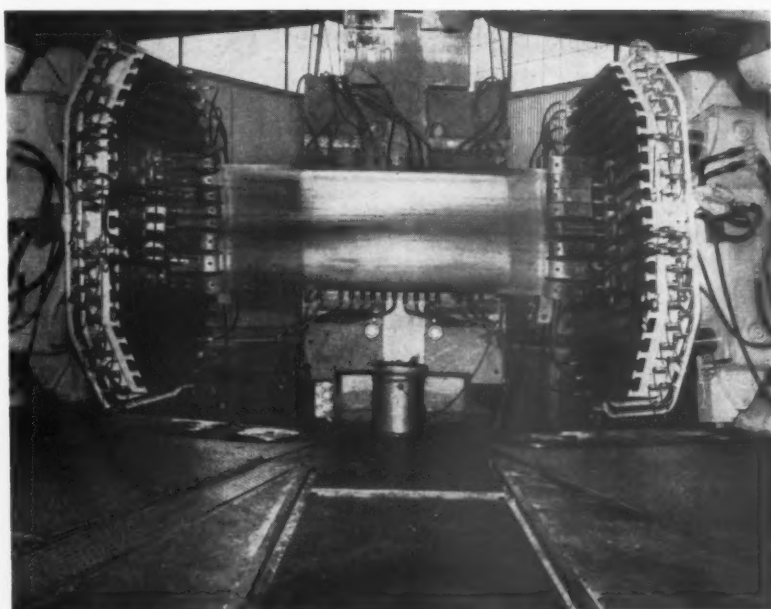
## New clamp stops metal tearing

A NEW-TYPE hydraulic clamp is being used in metal stretching operations at Rohr Aircraft Co., Riverside, Calif. Designed to grip edges of sheet metal during forming processes in which a heavy tension is applied to the sheet, the clamp was invented by J. C. Weidel, tool superintendent at Rohr's Riverside plant, and M. B. Laddon, formerly employed with Rohr but present vice president and general manager of Langley Corp., San Diego.



**SEMI-CIRCULAR GUIDES** compensate for any misalignment of clamp jaws.

Clamp consists of a heavy steel body with a connecting link at one end which is attached to a forming machine, and an opening at the other end containing the gripping jaws. Walls of the opening slope away from each other from the outer end to the inner end of the opening. Walls have a semi-circular recess containing a semi-cylindrical jaw holder guide. These



**FLUID UNDER PRESSURE** in each of the clamps in the two batteries shown here provides an even clamping action on sheet metal.

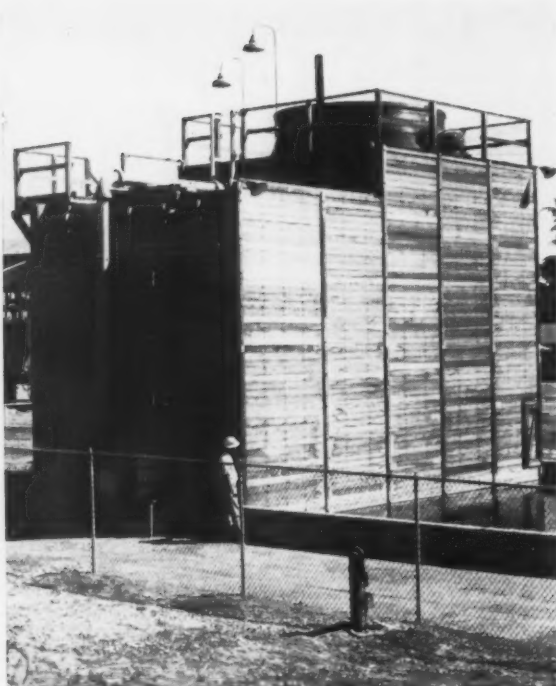
guides rotate to a limited degree in the recess. Jaw holders are positioned in the opening.

Lower ends of the holders project toward each other to form a retainer under the jaws in which the enlarged end of a piston rod is seated. The piston rod extends into the body of the clamp to a hydraulic cylinder and piston assembly providing the actuating power to the clamp's jaws.

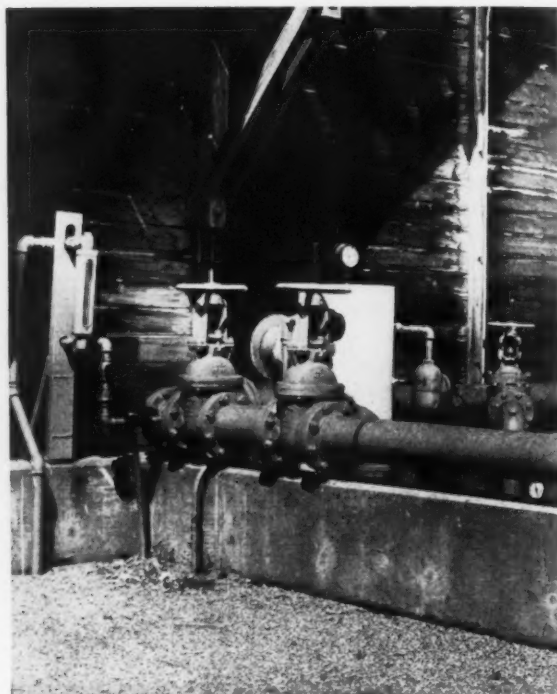
Fluid entering the cylinder forces the piston rod outward and moves the sloping faces of the jaw holder along

the guides. Thus, the gripping jaws are moved toward each other to grip the sheet. The semi-circular guides, being free to rotate, compensate for any misalignment of the jaws, allowing the jaw holder to shift so that the entire gripping faces of the jaws come in contact with the surface of the sheet. They also compensate for any spreading apart of the portions of the clamp body on each side of the jaws, which frequently happens in other clamps when heavy tension is applied to the sheet.





**REDWOOD COOLING TOWER**, induced draft, gravity distribution type, is saving water dollars for Monsanto Chemical in San Jose, Calif., by insuring pressure.



**VALVES FOR ROUTING WATER** to process plant as needed and for emergency cut-in to the fire fighting system control flow of water from tower and reservoir.

## No-waste water system

- insures water supply, both for processing and fire protection.
- greatly reduces water costs.
- solves problem of inadequate water pressure.

**D**O you have a cooling water problem, lack of pressure, insufficient supply? Then you will be interested in the way Monsanto Chemical Co., located in San Jose, Calif., solved its problem and at the same time made a cost reduction. In this case, the problem was insufficient water pressure which limited supply.

For the first few years of its operation, the plant operated on water from the San Jose city water supply, under an arrangement that occasionally left it high and dry due to the seasonal demands of local canneries, increasing year-around industrial usage, and an ever-lowering water table in the San Jose area. To run efficiently, Monsanto needs a water supply of 400 gpm. at 65 deg. F., delivered at a point 40 ft. above the ground level (top of the highest condenser).

In 1953 it was decided that something must be done to insure a constant water supply. It was finally de-

termined that this something should be the installation of a cooling tower for recirculating water. This tower was to provide: (1) an insured water supply, both for processing and fire protection; (2) a greatly reduced water bill; (3) conservation of a limited resource.

After careful examination of cooling towers, keeping in mind their several needs, Monsanto engineers selected a single-flow cooling tower of standard commercial design. As a result of this installation—late in 1953—water consumption dropped from 810,000 cu. ft. per month to about 100,000 cu. ft. per month.

### SYSTEM BUILT FOR EXPANSION

First of all, a huge reservoir holding 160,000 gal. was dug and lined with concrete. This reservoir is shaped in such a manner that the cooling tower

covers only one third of the surface area. Consequently, if future needs should dictate, cooling capacity can be tripled by simply installing two more towers identical to the first.

Of the 160,000 gal. capacity of the reservoir, only 40,000 gal. are needed to operate the tower. The remaining 120,000 gal. serve as a reserve for the fire protection system or as reserve process water. If the outside water supply is completely cut off, neither processing nor adequate fire protection will be temporarily slowed or jeopardized.

A 1,000-gpm. pump at 60 psig. is held in reserve for fire protection. Further insurance is added by the fact that the 50-hp. electric motor which drives the pump is tied in to an electric circuit of its own in case of a general power failure in the plant. The 1,000-gpm. pump can also be used to tap the reservoir's full 160,000 gal. for processing. If city water pressure fails, this



pump switches on automatically at a predetermined minimum water pressure in the case of fire. Under similar conditions, the pump is turned on manually to obtain processing water. Thus, the processing and/or fire protection water supply is unbroken.

#### **WATER CIRCULATED BY TWO 600-GPM. PUMPS**

Water is circulated through the tower and plant processing by two 600-gpm. pumps, each driven by a 30-hp. motor. These two pumps and motors, along with the 1,000-gpm. fire protection and emergency pump, are located in a concrete lined pit adjacent to the tower.

Pump No. 1 runs continuously and is normally sufficient to meet processing demands. If water needs exceed 500 gpm. or if water pressure into the plant drops below 60 psig., the second pump automatically switches on. When less than 500 gpm. are required, excess water is routed by an automatic valve back into the top of the tower rather than on into processing.

#### **DOUBLE ORIFICE LEVEL INSURES EVEN DISTRIBUTION**

The cooling tower is an induced draft, gravity distribution type, constructed of redwood lumber with galvanized fittings. An open distribution deck with orifices on two levels because of varying water load insures even deck coverage with varying volumes of water. Water returns from the plant and would ordinarily be cooled to about 80 deg. F., but because of intermittent demand it is generally cooler than this. A two-speed fan at the top of the tower provides greater control of cooling.

#### **SULFURIC ACID ADDED**

A regular maintenance schedule keeps the tower operating efficiently with very few hours per month of servicing or bookkeeping. Santobrite (sodium pentachlorophenate), a Monsanto product, is added periodically to inhibit algae formation. A glance at the distribution deck and reservoir tells the operator whether it is necessary to add chemicals to keep the algae down. PH is maintained between 6.5 and 7 to control corrosion. Sulfuric acid is added to maintain pH within this range. Metaphosphate is constantly added to prevent formation of scale in process equipment.

Total solids in the water are kept below 1,400 ppm. by constantly replacing cooling water from the local water supply.



Flangeless wheel unit rides on steel beams to carry this . . .

## **Longest span crane**

**W**HAT is believed to be one of the longest span underhung cranes in the country will soon be serving a new maintenance hangar at Edwards Air Force Base, near Palmdale, Calif.

Fabricated by Crane Hoist Engineering Corp. of Los Angeles, the crane spans the 300-ft. width of the 180,000-sq. ft. hangar. The crane bridge travels the entire 600-ft. length of the building approximately 75 ft. above the floor. Thus the interior of the repair facility is serviced in its entirety. Lifting capacity is rated at 5 tons.

Speed of the huge crane bridge is 150 fpm. and the trolley will travel at 100 fpm. Power for both bridge and trolley incorporates fluid drive. The hoist is a two-speed, 5-ton lift at optional 5 or 16-fpm. rate.

An adjoining hangar shop service building, of some 183,000 sq. ft., is also serviced by Crane Hoist Engineering cranes and monorails varying from one to five tons in capacity.

Crane Hoist has been able to simplify fabrication of these cranes through use of Bethlehem Steel Co. A-94 high silicon standard wide flange structural steel beams. No special milling of the inside surfaces of the flanges is necessary.

Flangeless wheels, which suspend the trolley and hoisting mechanism, find easy going on these surfaces as they arrive from the mill. They are

kept in perfect alignment by side rollers also designed by Crane Hoist. Because they are flangeless, the wheels ride closer to the web of the beam, utilizing the strength of these standard structural steel beams to full advantage.

Bridge beams for the crane are also Bethlehem A-94, joined together to form continuous 300-ft. lengths.

A. C. Martin and Assocs., Los Angeles, were architects and engineers on the hangar.



**SIDE ROLLERS** on unit's flangeless wheels maintain alignment.



# How to head off steam line repairs

*Key lies in steam traps, and trap maintenance begins in the boiler room with proper water treatment.*

**A**T ONE LARGE battery of dry kilns that tried to operate without proper treatment of boiler water, two repair men worked six days a week with added hours of overtime, just doing necessary repairs on the steam lines.

These repairs included everything from new valves and pipe fittings to new and more traps. For a period of six months they worked in conjunction with the regular maintenance man, who spent most of his time making up lists of required repair parts.

The cost of these extensive repairs was prohibitive. As a corrective measure, an injection system was installed in the powerhouse to pump corrosion-preventive chemicals directly into the steam main to the kilns.

This system was further improved upon. The chemicals are now injected into the boiler feed water, adding protection to the steam system in the entire plant as well as reducing the cost of operation for the dry kilns.

Obviously then, preventive maintenance of steam traps begins in the boiler room and follows an orderly path through the entire steam system, and more or less ends on the repair bench.

The second step of preventive steam-trap maintenance for dry kilns is less direct, but there is a connection. Each kiln has several valves for controlling the steam supply. The automatic valves must have the packing glands repacked or tightened at regular intervals to prevent their leaking excessively or failing to function properly.

Improper functioning of these valves may throw an excess of steam against the traps, or the valves may not open and leave the trap idle. On top of the packing gland nut there is usually a shallow depression. We have found

that a drop or two of heavy oil applied to the valve stem at this point will afford sufficient lubrication of the stem and packing gland to keep the valve in good working order.

Up to now the steam trap has been mentioned as only a part of a complex system of valves and pipes, yet the trap is a very important part of the entire heating system.

Regardless of the make or type of trap used, its one purpose is to pass condensate and retain live steam. Whether the parts be complex or simple makes little difference, so long as they function properly. Each piece has a specific size and shape that must be maintained to keep the trap in good working order.

To keep each trap in perfect condition, a system of routine checks is helpful. The interval of these routine checks may be one month, two months, or three months, depending upon local conditions.

## RECORDS MAKE ADJUSTMENT EASY

At first, a trial period may be set up and increased or decreased according to the condition of the trap at the end of the period. Having kept a record of each inspection, it is easy to tell how long the interval between checks should be. How does one check the operation of the trap?

If you can see the trap and can drain the exhaust outlet to the atmosphere, put a valve on the exhaust side of the trap and open it when you want to check the trap. A little experience will tell whether the trap is opening or closing properly.

If the trap is in a position where you can reach it but cannot exhaust to the atmosphere, listen to how the trap is working. Hold a stick of wood, a screwdriver, or a similar sounding device against the trap housing and against the ear to listen to what is going on inside the trap. The inside workings of some traps can be heard without such aids.

The second method of steam trap maintenance is corrective. It involves work right from the beginning. By corrective it means you wait until

### AUTHOR OF THIS ARTICLE

... **James W. Jacobsen** of the **Ralph L. Smith Lumber Co.** in **Anderson, Calif.**, relates some measures which have helped his firm operate kilns with a minimum of down-time.

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One of the twelve strapping stations set up by Quaker Export Packaging Co. to handle "Operation Poinsettia."

## Signode power machines strap 600,000 cartons of food for export in 30 days!

Start November 14th and package 3,592,500 food parcels for shipment overseas in time for Christmas? It was done—in an amazing demonstration of fast organization and sustained effort, with the parcels packed six to a carton, cartons sealed, and reinforced with two steel straps.

Says Benjamin Bernstein, President, Quaker Export Packaging Co., Inc., Philadelphia, "In approximately thirty working days we applied over 1,250,000 straps. During the entire operation there was no major breakdown. This proves the excellence of the design and engineering of the machine, and the excellent service and installation."

This is unitizing on a big scale (and on a hurry-up basis . . . in little more than a week after the first call from Quaker Export, Signode had delivered the power strapping machines and set them up for operation).

Dependability—and experienced, helpful follow-through—are part of every item in the complete line of Signode hand and power tools for tensional steel strapping. For additional information, or a survey of your needs, write,

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... for more details, circle No. 19 on Reader Service Postcard

something goes wrong on your kiln control.

To cite one instance, the temperature pen on the kiln chart drops below setting, and you start checking the air lines, diaphragms, and so on until you come to the trap. You may find the trap is not working and needs repairs. It takes time to dismantle and repair a trap.

An extra trap or a complete set of traps costs very little compared to an hour lost on a kiln charge of lumber. Therefore, I keep a spare trap in readiness and can install the good trap and start the kiln again without delay. I can then repair the worn trap as I have time—not in the back end of a dark kiln, but under a light on a repair bench.

Wet-bulb water supply ties in directly with trap maintenance and repair, for we have found that condensate from the trap is the best readily available water for the wet-bulb wick. We have a storage tank on top of the kilns for holding a supply of condensate. We pass this condensate through a commercial filter before piping it to the wet-bulb drip wells.

We also inject condensate into our steam spray system for conditioning the lumber to remove drying stresses. All excess condensate is returned to the power house for re-use in the heating system.

These measures have helped us at the Ralph L. Smith Lumber Co. to operate our kilns with less down-time and less repairs than formerly.

## LABOR CONFERENCE will be West's first

VITAL and current subjects in employer-employee relations will be explored at the Western Labor-Management Relations Conference, scheduled to be held at the Fairmont Hotel in San Francisco, January 18. First of its kind in the West, the conference is jointly sponsored by the California State Chamber of Commerce and the Chamber of Commerce of the United States.

In announcing the full-day session, Carl F. Wente, president of the California State Chamber of Commerce, said the conference will provide the opportunity for management men throughout the Western states to meet with leading labor-management relations spokesmen and authorities in private business as well as top policy administrative officials of the federal government.

About 1,000 representatives of management in the 11 Western states are expected to attend the session.





# 50 BEARING MANUALS

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Here are reviews of 50 available manuals covering bearing design, application, maintenance. Obtain your selection by circling item numbers on a rip-out postcard.

**P**RESENTED below are concise abstracts of 53 manufacturer technical manuals and bulletins covering all phases of just one subject—bearings. Packing in their pages tremendous bearing know-how, they are offered free of charge to key production and plant operating men in Western manufacturing plants.

Collected over the past three months by the editors of **WESTERN INDUSTRY**

as a special service to readers, the manuals reviewed here were selected to provide you with the latest and most complete information available anywhere on bearing design, application, and maintenance. You will find here one or more manuals on every type of bearing and related product—smallest to largest, standard or special, suiting the entire range of varying plant operation, equipment, and

product requirements—on pages 33 through 38.

You are invited to check this listing quickly and select those manuals that promise to be most helpful with your bearing problems. Circle appropriate key numbers on the Reader Service Postcard bound into this issue, and we will be glad to see that you obtain your complete selection promptly.

### Dodge bearing line featured in 304-page power transmission manual

Sixty-two pages of catalog D-55 describes the entire line of Dodge bearings including ball, sleeve, and babbitted in pillow blocks, take-ups, flange mounts, hangers, and many other types. Also included is data pertinent to base plates for pillow blocks and oil rings for the bearing line. This is the Dodge complete power transmission manual, describing in detail the firm's 6,000 manufactured items—a veritable encyclopedia. *Dodge Manufacturing Corp.*

... for your copy circle No. 150

### Complete facts on Link-Belt ball and roller bearings

Link-Belt Catalog 2550 is a 120-page encyclopedia on the company's entire line of bearings and accessories, supplemented by engineering data on selection of bearings, tables on load ratings, guides for maintenance and lubrication, and other technical information. *Link-Belt Co.*

... for your copy circle No. 151

### Maintenance handbook on Hyatt roller bearings

This 32-page handbook is an instruction book for service men and machine builders, telling correct procedures for installing, removing, storing, and lubricating Hyatt roller bearings. *Hyatt Bearings Division, General Motors Corp.*

... for your copy circle No. 152

### Super-precision instrument bearings

Form 1543-2 covers M-R-C instrument bearings, their materials, specifications, and dimensions. Eleven pages in all, including interchangeability tables. *Marlin-Rockwell Corp.*

... for your copy circle No. 153

### How to select miniature bearings

Tables and nomographs in this reprinted article are of use in selecting miniature bearings for electronic devices. Illustrated. *Miniature Precision Bearings, Inc.*

... for your copy circle No. 154

### 120-page manual on Rollway roller bearings

Catalog AD-1251 is a comprehensive detailing of Rollway roller bearings under following major classifications: precision type radial and thrust bearing selection and engineering information; dimensions and load rating tables, radial type; thrust type; steel cage type; and Tru-Rol series. *Rollway Bearing Co.*

... for your copy circle No. 155

### Complete specs on SealMaster ball bearing units

This 64-page catalog (No. 454) covers SealMaster ball bearing units from A to Z—giving description, dimensions, and load ratings. General information includes hardness and temperature conversion tables and dimension and weight tables. *Stephens-Adamson Mfg. Co.*

... for your copy circle No. 156

### Application data on Torrington needle bearings

This is described by Torrington Co. as an engineering short course on bearings, offered for practical use in selecting needle bearings by type, size, and suitability. Descriptive material on each type of bearing includes design, construction, materials and finishing, lubricating, housing and shaft requirements, load capacities, and recommended installation methods. Well illustrated. *The Torrington Co.*

... for your copy circle No. 157

### Complete specs on Hyatt roller bearings

Dimensions, load ratings, and application data on Hyatt roller bearings are contained in the 70 pages of Catalog 150. Photographs, diagrams, and graphs illustrate text. *Hyatt Bearings Division, General Motors Corp.*

... for your copy circle No. 158

### When to use split ball bearings

This reprint of an article that appeared in *Product Engineering* is a good discussion on the use of single fracture outer race bearings and double fracture bearings. *Split Ballbearing Corp.*

... for your copy circle No. 159



### 52-page manual on Aetna ball and roller bearings

This 14th edition of the Aetna catalog contains sections on bearing selection and care, clutch release bearings, standard thrust bearings, special products, and technical and general information (for instance, calculation of thrust loads and proper bearing lubrication). Replete with photographic illustrations, *Aetna Ball and Roller Bearing Co.*

... for your copy circle No. 160

### New Departure bearings for conveyors

Technology on bearing applications in conveyor lines is covered in this 16-page Booklet C. Lubricated-for-Life ball bearing series is pictured in many installations and cataloged as to dimensions and capacities. *New Departure Division, General Motors Corp.*

... for your copy circle No. 161

### Manual on Oilite bearings

Fifty pages of data on Oilite products and processes are offered in Manual E-55. Information on self-lubricating bearings includes typical properties and design features. Contains abundant application data. *Chrysler Corp.*

... for your copy circle No. 162

### Bronze bearings

Complete stock of bearings handled by Kingwell Bros. Ltd. through their San Francisco office and plant and Los Angeles branch is covered in 40-page Catalog 55, under following headings: special bearings, standard stock bearings, oil grooving graphited bearings, bronze bar stock, Oilite plain bearings, Oilite flange and thrust bearings, and Oilite bars, plates. *Kingwell Bros. Ltd.*

... for your copy circle No. 163

### Continuous cast bronze bars

This 8-page bulletin tells the physical characteristics and lists sizes and weights of Asarco continuous cast bronze bars, solid and cored. Five typical shapes are pictured. *Kingwell Bros., Ltd.*

... for your copy circle No. 164

### Bearings for heavy loads and severe impact

Link-Belt Book No. 2565A has eight pages of data on "mill bearings" for heavy jobs, describing and illustrating special features, and showing typical installations. Dimension and load rating tables are included. *Link-Belt Co.*

... for your copy circle No. 165

### Babbitted and bronze bearing blocks

Folder 2387 contains in four pages a complete run-down on Link-Belt bearing blocks, as well as grease cups and lubrication fittings. *Link-Belt Co.*

... for your copy circle No. 166

### M-R-C power transmission bearings

This bulletin (Form 1535) contains dimension drawings and tables on M-R-C power transmission ball bearings as well as load ratings, shaft limits, and other data. Also listed in the 16-page booklet are interchangeable sizes with other bearing lines. *Marlin-Rockwell Corp.*

... for your copy circle No. 167

### Cooper split roller bearings

Series of data sheets covers main features of Cooper split roller bearings—materials, design, mounting, speeds, location, and thrust. *Cooper Split Roller Bearing Corp.*

... for your copy circle No. 168

### CSRB conveyor head shaft bearings

News Brief 16 gives a case history on use of Cooper split roller bearing in conveyor head shaft application. *Cooper Split Roller Bearing Corp.*

... for your copy circle No. 169

### Bulletin on two-bolt flange units

Dimension table covering SFT and MSFT two-bolt flange units in the SealMaster ball bearing line is contained on this single-page Bulletin SS-125. *Stephens-Adamson Mfg. Co.*

... for your copy circle No. 170

### All details on Heim bearings and pillow blocks

Catalog 100 has 32 pages of data on all types of Heim bearings and pillow blocks, with emphasis on Unibal spherical bearings and spherical bearing rod ends, designed for greater carrying capacity. *Heim Co.*

... for your copy circle No. 171

### Introduction to new unit pillow block

This 10-page bulletin (Form 370) describes and shows the new SY unit pillow block with SKF Red Seal for retaining lubricant; the SKF single row, ball bearing aligning unit; and the FY unit flanged mounting. Table gives load ratings of the three units. *SKF Industries, Inc.*

... for your copy circle No. 172

### Bearing line with crowned rollers

Catalog TR854-DC in 36 pages covers Tru-Rol roller bearings, which all now have crowned rollers. Crowning process is explained in section on bearing selection. Other sections are dimensions and load ratings, application, bearing mounting, and appendix of general information. *Rollway Bearing Co., Inc.*

... for your copy circle No. 173

### How to handle instrument bearings

Engineering sheet covers conditions essential for good performance and long life of precision instrument bearings, treating such problems as dust, dirt, grit, and corrosion, outside diameters, bores, radial play, magnetism, air gaging, and visual inspection. *Miniature Precision Bearings, Inc.*

... for your copy circle No. 174

### Randall bronze sleeve bearings

This 8-page bulletin (No. 113), offers condensed information and specifications on Randall bronze sleeve bearing products: graphited bearings, bronze bushings, bronze bar stock, sheet lubricators, and bronze castings. *Randall Graphite Bearings, Inc.*

... for your copy circle No. 175

### 50 pages of data on Dodge rolling bearings

Pillow blocks, flanged cartridge mounts, take-up bearings, hanger bearings, interlock and double interlock bearing units, and other special bearings in the ball type are described in 50-page Bulletin A-638. Included in this listing of Dodge-Timken bearings is full specification, selection, and application data. *Dodge Manufacturing Corp.*

... for your copy circle No. 176

### Chiksan ball-bearing swivel joints

Catalog G-4 offers a general description of swivel joints for handling air, hydraulics, fuels, oils, water, and other fluids—as well as dimensions and other details on all types and styles manufactured by company. An attractive catalog, well illustrated, with informative text. *Chiksan Co.*

... for your copy circle No. 177

### M-R-C aircraft ball bearings

Drawings and dimension tables give the data on M-R-C airframe (aircraft control) bearings, which have cadmium plated exposed surfaces and are corrosion resistant. Interchangeability table completes this 16-page bulletin (Form 1527-5). *Marlin-Rockwell Corp.*

... for your copy circle No. 178

### Single and double fracture split ball bearings

This 21-page catalog (No. 55) covers the special type bearings offered by Split Ballbearing Corp.: bearings in which either outer race only or both the inner and outer race are fractured. In addition to data tables on each series, text covers assembly and disassembly instructions and tips on bearing selection. *Split Ballbearing Corp.*

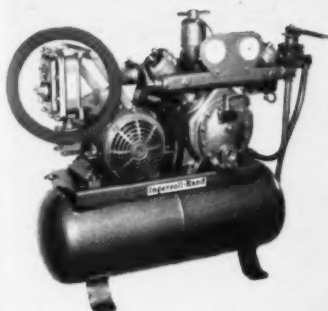
... for your copy circle No. 179

### Ampco stock products

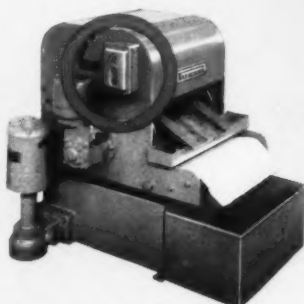
This 6-page folder (Bulletin G-2) puts the spotlight on Grades 8, 18, and 24 in the Ampco Metal series of special copper-base alloys. Grade 18 is the designation for centrifugally cast stock bars, recommended for bearing applications because of their strength, toughness, and resistance to deformation under load. *Ampco Metal, Inc.*

... for your copy circle No. 180

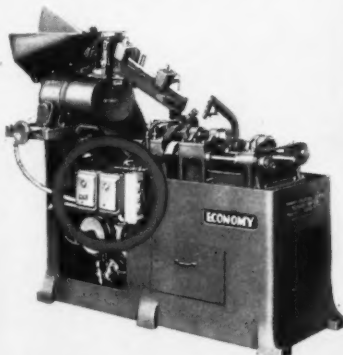




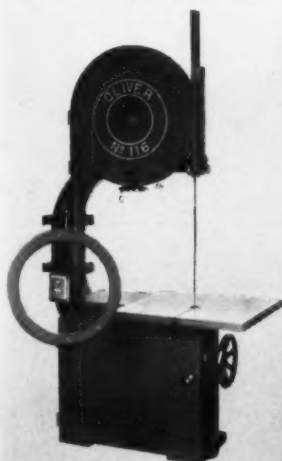
A-B explosion-proof solenoid starter on liquid petroleum gas compressor.



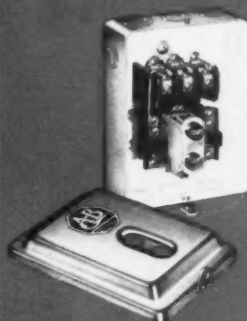
A-B Bulletin 609 manual starter on Barnes-drill magnetic and fabric filter.



A-B solenoid starters and 3-button station on Economy shaving machine.



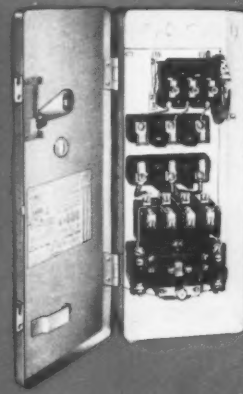
A-B Bulletin 709 solenoid starter on Oliver 36 inch, 5 hp band saw.



Bulletin 609 manual starter showing overload breakers



Bulletin 709 automatic solenoid starter



Bulletin 712 combination starter with fuses and disconnect

## 3 MOST POPULAR MOTOR STARTERS

These three across-the-line starters are so popular because each is a **QUALITY** product in design and construction, which provides continuously accurate and reliable thermal overload protection. Costly motor burn-outs are prevented and machine shutdowns are avoided.

### Bulletin 609 Manual Starters

Because these starters are push-button operated, they can be mounted in close groups if necessary. Switching mechanism is both "quick make" and "quick break." Sustained overload trips the starter and stops the motor. The overload breakers are reset by pushing the STOP-RESET button. Available up to 5 hp, 220 v; 7½ hp, 440-550 v.

### Bulletin 709 Solenoid Starters

The simple design—only one moving part—of these remote control automatic starters assures long life and trouble free operation. Provide reliable motor overload protection. They also give no-voltage release protection that prevents the acci-



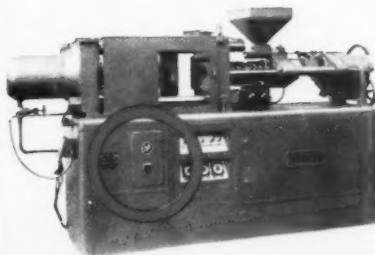
dental restarting of stalled motors. The operator must press the **START** button to restart the motor. Available in ratings up to 300 hp, 220 v; 600 hp, 440-550 v.

### Bulletin 712-713 Combination Starters

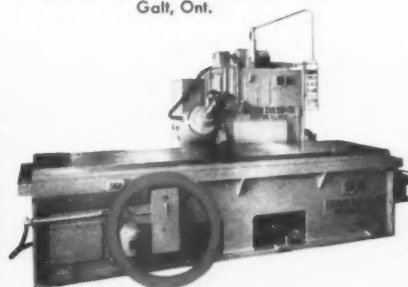
These compact starters save space and installation cost by combining magnetic starter and manual visible blade disconnect or circuit breaker in a single cabinet. This assures a neat, safe installation, because starter cabinet cannot be opened unless disconnect lever is in the "OFF" position. Available with manual disconnect up to 100 hp, 220 v; 200 hp, 440-550 v. With circuit breaker up to 200 hp, 220 v; 400 hp, 440-550 v.

Allen-Bradley Co.  
1316 S. Second St., Milwaukee 4, Wis.

In Canada—Allen-Bradley Canada Ltd.  
Galt, Ont.



A-B flush-type Bulletin 709 starter on Stokes injection molder.



A-B Bulletin 712 combination starter on Ekstrom-Carlson scarf mill.

10-55-MR

**ALLEN-BRADLEY**  
MOTOR CONTROL  
QUALITY





Allen-Bradley oil-tight push buttons

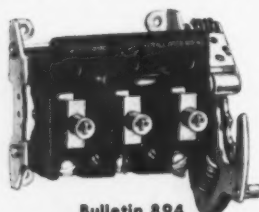
Allen-Bradley oil-tight pilot lights

Automatic control panel built into machine frame

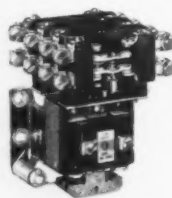
Modern Burr Master Gear Burring & Chamfering Machine built by Modern Industrial Engineering Co., Detroit, Michigan.

## How to Build Trouble Free Automatic Control Panels

### ALLEN-BRADLEY PANEL COMPONENTS



**Bulletin 894**  
Manual Visible Blade Disconnect



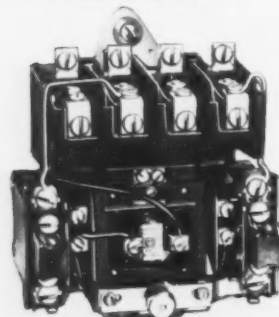
**Bulletin 700** Universal Relays up to 8 poles a-c or d-c



**Bulletin 891**  
Adjustable Fuse Clips



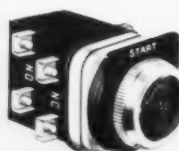
**Bulletin 800T** Oil-tight Pilot Light with glass lens



**Bulletin 709**  
Solenoid Starter



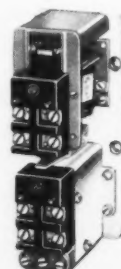
**Bulletin 350**  
Drum Switch



**Bulletin 800T** Oil-tight Push Button



**Bulletin 800T** Oil-tight Push Buttons



**Bulletin 849**  
Pneumatic Timer

Special control panels—to be reliable and trouble-free—must be built of reliable starters, relays, timers, indicating pilot lights, etc.

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QUALITY  
**MOTOR CONTROL**



### Complete Boston line listed in one catalog

Thirty-three pages of data outlining Boston Gear's complete line of bearings including radial ball, radial thrust, and thrust in precision, ground, and unground is included in Catalog 55. Also explained and illustrated are steel ball bearing sheaves, wheels, pillow blocks, flanged cartridges, and shaft supports. *Boston Gear Works*

... for your copy circle No. 181

### Reference manual on Orange roller bearings

This 40-page bulletin gives construction, dimensions, capacities, housing, and tolerance fits on complete line of Orange staggered roller bearings, full type and cage type needle bearings, journal roller bearings, cam followers, cam yoke rollers, and thrust roller bearings. *Orange Roller Bearing Co., Inc.*

... for your copy circle No. 182

### Bronze precision bearings

This is a thorough introduction to Oilite products (Bulletin S-53), with useful information on machining, finishing the bore, removing oil from bearings, and storing them. Oilite heavy-duty, oil-cushioned, self-lubricating bronze standard bearings are cataloged and described in 26 pages of text and tables. *Chrysler Corp.*

... for your copy circle No. 183

### Streamlined catalog on Miniature Precision bearings

Here is a 24-page bulletin on MPB precision ball bearings for delicate mechanisms. Series covered include radial, flanged radial, radial retainer, grooved radial and grooved radial retainer, and high speed bearings. *Miniature Precision Bearings, Inc.*

... for your copy circle No. 184

### High-speed M-R-C spindle bearings

Here is a 6-page folder on M-R-C super-precision and Ultra super-precision ball bearings with description, special qualities, and illustrations, and listing model numbers and dimensions. *Marlin-Rockwell Corp.*

... for your copy circle No. 185

### Pocket-size handbook on Micro miniature bearings

This 28-page handbook (Catalog 53) covers Micro precision instrument ball bearings. Separate page for each series of bearings gives complete details. General information includes materials, tolerances, torque tests, lubrication, load ratings and life, as well as other subjects. *New Hampshire Ball Bearings, Inc.*

... for your copy circle No. 186

### CSRB bearings at high temperatures

News Brief 6 covers two "hot" applications of Cooper split roller bearings, one on a machine making waxed paper where working temperature of the bearing is over 430 deg. F.; the other on the trunnion of a steam jacketed drying cylinder. *Cooper Split Roller Bearing Corp.*

... for your copy circle No. 187

### Engineering journal on Timken roller bearings

This illustrated, indexed reference work has almost 300 pages covering in a systematic and exact style all types of Timken bearings. Compiled for use of engineers and machine designers, it offers technical data on ratings, load calculations, bearing selection, and other information pertinent to mounting, use, and maintenance of Timken bearings. *Timken Roller Bearing Co.*

... for your copy circle No. 188

### Complete data on Nice bearings

Nice Catalog 150 lists standard radial, thrust, and combined radial-thrust bearings of both precision and unground types, and includes several new lines recently announced. Ball bearing rollers, sheaves, wheels, and other anti-friction products are included with capacity ratings, complete specifications, and engineering data. *Nice Ball Bearing Co.*

... for your copy circle No. 189

### Bearing calculator

Here is a pocket slide rule calculator to aid in selection of proper bearing size, which can also be used to convert Aetna catalog rated loads to loads at other speeds, to determine desired life at other speeds, and to estimate life expectancy. *Aetna Ball and Roller Bearing Co.*

... for your copy circle No. 190

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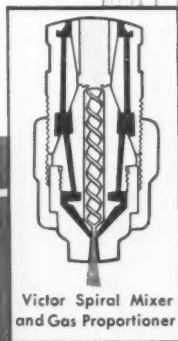
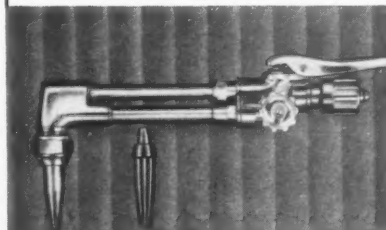
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... for more details, circle No. 21 on Reader Service Postcard



#### Extra-light, thin-sectioned Kaydon line

Kaydon Real-Slim line of lightweight ball bearings ranging in diameter from 4 in. to over 40 in. is illustrated and specified in Catalog 54. Life factors, complete engineering data, speed factors, and other specifications are included. *Kaydon Engineering Corp.*

... for your copy circle No. 191

#### Randall sleeve bearing pillow blocks

Catalog No. 112 covers Randall pillow blocks, from one-piece steel housing unit to flange or side mounts, as well as ball assemblies, safety collars, thrust washers, and bearing brackets. 12 pages. *Randall Graphite Bearings, Inc.*

... for your copy circle No. 192

#### Design and application of special miniature bearings

When, where, and how to use special miniature bearings are outlined in this reprinted article. Here are ideas for solving difficult selection problems in miniature bearing field. *Miniature Precision Bearings, Inc.*

... for your copy circle No. 193

#### Link-Belt ball bearing pillow block

New Folder 2517 covers Series JPS-200 ball bearing pillow block nion of a steam jacketed drying cylinder. *Cooper Split Roller Bearing Corp.*

... for your copy circle No. 194

#### Aluminum bronze alloys for bearings

Bulletin 33 covers in 20 pages specifications on Ampco Metal, giving characteristics, chemicals, physicals, and recommended applications of grades in this series of special copper-base alloys. *Ampco Metal, Inc.*

... for your copy circle No. 195

#### How to mount miniature ball bearings

Reprinted article discusses six basic methods of mounting miniature ball bearings, using interference fits, side clamping, snap rings, rolling or spinning, etc. *Miniature Precision Bearings, Inc.*

... for your copy circle No. 196

#### New line of pillow blocks and flange mounts

Dodge's new SL line of ball bearing pillow blocks and flange mounts is illustrated and fully described in Bulletin A-645, which includes full specifications, radial load ratings, and other selection data. *Dodge Manufacturing Corp.*

... for your copy circle No. 197

#### Sealed ball bearing features outlined

New Departure's Senti-seal line of ball bearings is pictured and explained, listing 17 key advantages and showing cut-away and components drawings in Bulletin S. S. Lubrication features are also detailed. *New Departure Division, General Motors Corp.*

... for your copy circle No. 198

#### Shafer ConCaVex bearings

Four-page folder gives general and detailed information, with diagrams, on Shafer self-aligning roller bearings. *Shafer Bearing Division, Chain Belt Co.*

... for your copy circle No. 199

#### High carbon chrome and stainless steel balls

New Departure line of balls for bearing application is specified giving grades, sizes, accuracies, number of balls per pound and container in brochure 16-BS. *New Departure Division, General Motors Corp.*

... for your copy circle No. 200

#### Ampco wrought products

Bulletin WP-2 gives full information in 20 pages on wrought rod, pipe, tube, and other extruded products made from Ampco series of special copper-base alloys. These are regularly used for bearings, bushings, valve seats, and other vital wear parts. *Ampco Metal, Inc.*

... for your copy circle No. 201

#### Shafer bearing design

Practically wallet-sized, this booklet efficiently explains the ConCaVex design of Shafer bearings, with a dozen diagrams, even more photographs. *Shafer Bearing Division, Chain Belt Co.*

... for your copy circle No. 202



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... for more details, circle No. 22 on Reader Service Postcard  
**WESTERN INDUSTRY — December 1955**



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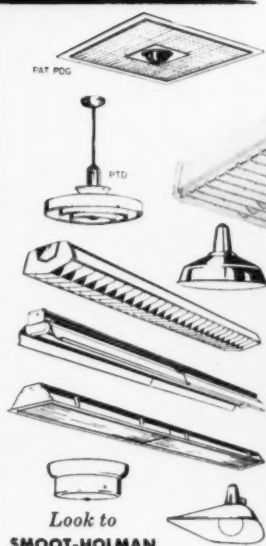


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**WESTERN INDUSTRY — December 1955**



# HELPFUL LITERATURE

for the West's plant  
operating executives

FOR YOUR FREE COPIES, circle appropriate key numbers on postcard, page 45

## Air power tools

Aro equipment described in new booklet and catalog sheets includes balancers, blow guns, speed couplers and connectors for air operated equipment, oilers, filters, and regulators, backing pads, tool mounting fixtures, automatic drills, and Par-A-Matic drills for multiple drilling. Each product is described, pictured, and, where applicable, examined in detail through tables of specifications, dimension data, and other information. *Aro Equipment Corp.*

... for your copy circle No. 203

## A 74-page handbook on V-belt drives

New handbook offers useful information on design features, basic drive principles, and technical data on sheaves, as well as tips for economical and dependable operation of V-belt drives. Color tables are an aid to selection of A, B, C, D, and E section Tex rope belts. *Tex-Book 20P40. Allis-Chalmers Mfg. Co.*

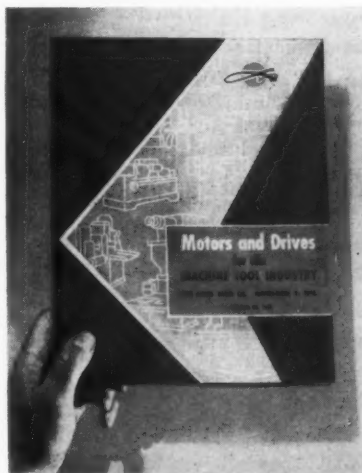
... for your copy circle No. 204

## Flexible shafting application data

Four typical problems of power transmission are analyzed and solved with flexible shafting in this 8-page bulletin, in addition to pictures and text on actual applications. A thorough discussion of cores, casings, core fittings, and casing ferrules, as well as operating characteristics of flexible shafts, makes up the remainder of the booklet. *Elliott Manufacturing Co.*

... for your copy circle No. 205

## Technical data on motors and drives



Informative and colorful, this bulletin covers more than 15 standard and special motors and adjustable speed drives manufactured by Louis Allis. Over 19 installation photographs, as well as technical data on electrical features. *Louis Allis Co.*

... for your copy circle No. 206

## Installation and maintenance of electronic controls

Foreword to this 16-page bulletin (EC1) states that the text has been kept simple, brief, but complete, to be helpful to persons responsible for installation and maintenance of Dynamatic equipment. Basic electronic circuits used with Dynamatic eddy-current adjustable-speed drives are fully discussed and standard production model control described in detail. *Dynamatic Division, Eaton Manufacturing Co.*

... for your copy circle No. 207

## Carbon and alloy steel tubing

New 8-page catalog entitled "Ostuco tubing" describes four major classes of carbon and alloy steel tubing: mechanical, pressure, airframe, and aircraft mechanical. Seamless and electric resistance welded tubing are covered, as well as tube fabricating and forging. *Ohio Seamless Tube Division, Copperweld Steel Co.*

... for your copy circle No. 208

## Air-powered drilling and tapping unit

Attractive bulletin (BL-5R) on Bellows-Locke drilling and tapping unit covers in its eight pages the operating advantages of this drill unit and data on standard specifications and optional accessories. *The Bellows Co.*

... for your copy circle No. 209

## Materials handling cost-saving methods

Ten well-illustrated case histories of materials handling applications are presented in this 24-page issue of Clark Equipment Co.'s industrial truck division periodical. New methods to handle scrap, refrigerated display cases, lumber, chemical supplies, synthetic rubber, canned seafood, building supplies, and railroad freight, and use of fork trucks to feed paper into printing presses and to take the place of scaffolding in construction work are described. New Clark equipment—Mobilvan system, Powrworker hand trucks, and 90-deg. rotating clamp attachment—are also covered. *Clark Equipment Co.*

... for your copy circle No. 210

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... for more details, circle No. 26

### Tips on chain conveyors

This folder (55-11) is good reference material for anyone with a problem to solve in developing and engineering a chain conveyor. It shows the great variety of stock attachments, made-to-order attachments, and special attachments available in Rex roller chain line. Each is pictured. Chain Belt Co.

... for your copy circle No. 211

### Operating data on variable speed drive

Tables and drawings illustrate this 8-page bulletin (No. K-200) on Cleveland speed variator, including a sectional assembly diagram showing all operating parts for this compact drive, which provides infinitely variable output speed over a range up to 9:1. Cleveland Worm and Gear Co.

... for your copy circle No. 212

### Fork lift truck automatic transmission

Advantages of the TowmoTorque Drive, new automatic transmission for fork lift trucks, are pointed out in new booklet. This feature is now available on almost all Towmotor models. Towmotor Corp.

... for your copy circle No. 213



"PUT AN END  
TO YOUR  
WIRE PROBLEMS WITH  
INDUSTRIAL WIRE."

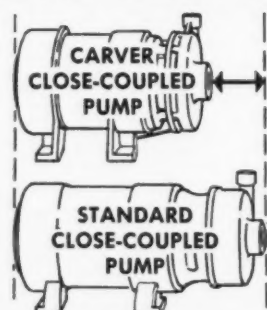
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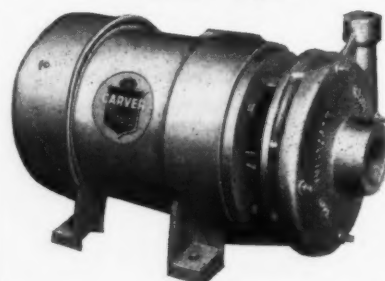
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... for more details, circle No. 27

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... for more details, circle No. 28

WESTERN INDUSTRY — December 1955



### Automatic controls, and water conditioning

Bulletin GSP-901 covers in its 28 pages the impressive range of products and services of Hagan Corp. and its subsidiaries: Calgon, Inc., Hall Laboratories, Inc., and Buromin Co. Hagan engineers instrument and control systems and supplies components for systems. Calgon manufactures chemicals for water conditioning and other industrial uses. Hall Laboratories is a consultant on procurement, treatment, and disposal of industrial water. Buromin markets chemicals for water treatment. Illustrated with product photos. *Hagan Corp.*

... for your copy circle No. 214

### Overhead tramrail equipment detailed

Photographs and drawings in this 12-page bulletin (2008-L) show a variety of installations and equipment details of Cleveland Tramrail overhead materials handling equipment. Overhead track stresses and track peening are carefully discussed. Track switches, carriers, tractors, cranes, transfer cranes, gantry cranes, automatic handling systems, interlocks, discharge points, electrification, buckets and grabs are described and illustrated. *Cleveland Tramrail Division, Cleveland Crane & Engineering Co.*

... for your copy circle No. 215

### Data on switches and actuators

Micro Switch is offering its printed news sheet, "Uses Unlimited," to persons interested in the latest developments in switches—such as new illuminated push button switch, and new precision machine limit switch—and unusual, time-saving applications of switches. Also available: Data Sheet P99, covering push button actuators for panel mounted, manually operated switches, and Data Sheet 106, on appliance switches. *Micro Switch, division of Minneapolis-Honeywell Regulator Co.*

... for your copy circle No. 216

### Oil filter details

Here is an introduction to new Honan-Crane line of Full Flow oil filters, with sketches and text pointing out exclusive design features. Dimension and specification charts complete the story. *Houdaille-Hershey of Indiana, Inc.*

... for your copy circle No. 217

### Coating metal parts with tungsten carbide

This 16-page bulletin explains the new metal treating process called flame-plating, developed by Linde Air Products Co. and at present performed only by Linde, but now being developed for individual plant installation. Depicting this method of applying thin coatings of tungsten carbide on metal parts, flame plating applications are discussed, procedure for preparing and finishing parts is covered, cost questions answered, and physical

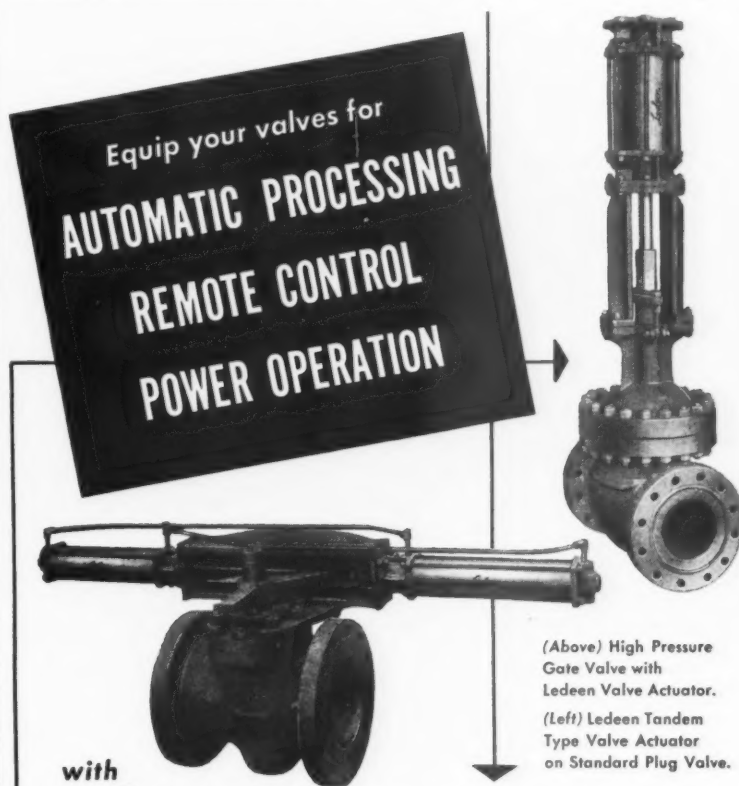
and chemical properties given. *Linde Air Products Co., division of Union Carbide and Carbon Corp.*

... for your copy circle No. 218

### Design and installation of fittings and tubing

New four-page bulletin (SF-155) describes design, use, and installation of Hoffman steel and zinc coated fittings and tubing. Standard sizes and shapes are illustrated, as well as three methods of assembly. *U. S. Hoffman Machinery Corp.*

... for your copy circle No. 219



(Above) High Pressure Gate Valve with Ledeen Valve Actuator.

(Left) Ledeen Tandem Type Valve Actuator on Standard Plug Valve.

## with Ledeen VALVE ACTUATORS

These actuators are for the automatic operation of gate, diaphragm, plug and other line valves, and are pneumatically or hydraulically operated for direct or remote control. Designed as package units, they are mounted directly on the valves without need of special manifolds or outside supports. They are easily, quickly and rigidly installed on new valves or on valves in service.

Ledeen Valve Actuators provide positive operation, permit automatic processing, safety installations, multiple central control, and require a minimum of maintenance. WRITE FOR BULLETIN 3000.

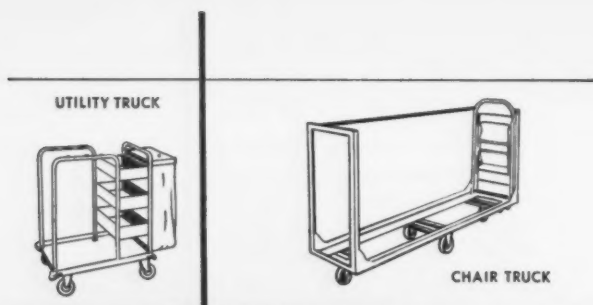
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LOS ANGELES 15, CALIFORNIA

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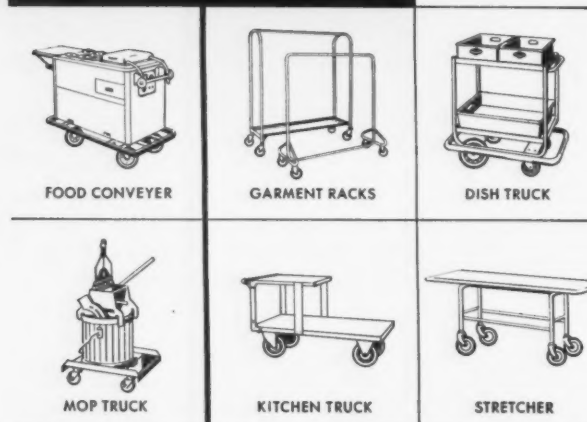
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**SPECIAL TRUCKS** are designed and built by Colson to your specifications. Phone or write for engineering assistance.

# COLSON

**CASTERS • WHEELS • HAND TRUCKS**

COLSON EQUIPMENT & SUPPLY CO.

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... for more details, circle No. 30 on Reader Service Postcard

### Die handling trucks

New bulletin is illustrated by operating photographs, pictures of major components, and engineering drawings on Elwell-Parker line of hydraulic die handling trucks. Text covers special features of this equipment, such as hydraulic push-off for accurate die positioning, and gives complete specifications. *Elwell-Parker Electric Co.*

... for your copy circle No. 220

### Dockboard problems, solutions

Thirteen typical loading problems, and their solutions, are in this 4-page folder. Among them: low dock, high truck; low dock, high rail car; narrow truck docks; wide loads, narrow doors; car-to-car loading. What's your loading problem? *Magnesium Co. of America*

... for your copy circle No. 221

### What atomic energy can do for you

Here is an up-to-date 44-page report on peaceful atoms at work in industry and agriculture, with an unusual collection of photographs on production of radioisotopes, handling and using isotopes in laboratories, development work on atomic power plants, and training people to work in field of atomic energy. *Union Carbide and Carbon Corp.*

... for your copy circle No. 222

### Fiberglas panels

New folder gives full information on new Alsynite fiberglas window panes for glazing and Alsynite corrugated building panels, with suggested construction details. Illustrated with typical industrial installations. *Alsynite Co. of America*

... for your copy circle No. 223

### Stainless steel siding

New Bulletin 70-5 describes mansard pattern stainless steel siding for single sheet and sandwich wall building construction. Specifications and installation data are also covered. *Joseph T. Ryerson & Son, Inc.*

... for your copy circle No. 224

### Electric fork truck details

Bulletin 1327D offers detailed information on Baker-Raulang's FS line of battery-powered trucks, with capacities of 1,500, 2,000, and 2,500 lb. Dimensions, capacities, weights, speeds, details of design and construction, and special attachments are all covered. *Baker-Raulang Co.*

... for your copy circle No. 225



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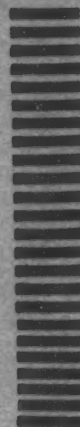
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# WHAT'S YOUR PROBLEM TODAY?

Make use of WESTERN INDUSTRY'S special service to readers. These business reply cards save you time, effort and expense in obtaining literature you want and full details on products and services described or advertised in this issue.

In addition, WESTERN INDUSTRY will help you locate sources of information concerning unusual plant operating problems that you may have. Write and describe your problem briefly, to: Editor, WESTERN INDUSTRY, 609 Mission St., San Francisco 5, Calif.



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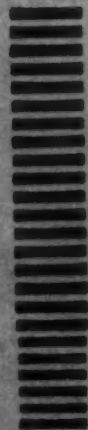
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# NEW EQUIPMENT for Western plant operation, production, and maintenance

USE RIP-OUT POSTCARD, page 45, for more information on products described

## AUTOMATIC SEGMENT GRINDER

... for rapid production of precision parts

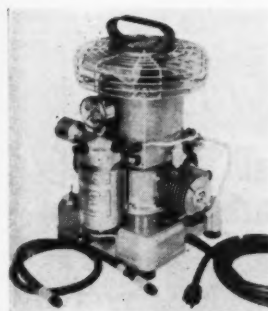


This three-station six-spindle segment grinder built by DoAll for Radio Corp. of America is a special machine tool evolved out of the standard DoAll grinder. Machine (1) automatically loads the part, aligns it, grinds it, and discharges it; (2) grinds both ends of a molded and sintered segment simultaneously to desired dimension, finish, and flatness; (3) produces pieces at a rate of one every three seconds. *The DoAll Co.*

... for more details, circle No. 226 on postcard

## HIGH-PRESSURE AIR COMPRESSOR

... provides fresh air free of contamination



New Cornelius compressor (Model 130R1500) weighs only 38 lb., is 17 in. high, and has capacity of 1.75 cfm. and rated discharge pressure of 3,000 psi. Unit is designed primarily to provide fresh air for breathing equipment but will give dependable service in supplying compressed air free of contamination with oil and moisture to laboratories, processing, service, and maintenance departments. Operates at 3,450 rpm. Three stages of compression. *Cornelius Co.*

... for more details, circle No. 227 on postcard

## ADJUSTABLE-SPEED DRIVE

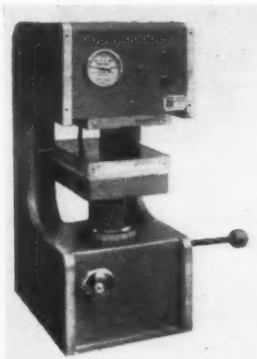
... "packaged," with electronic controls

Reliance VS-100 drive provides speed range of 100:1 with continuous electrical speed adjustment, which is highly stable over entire speed range. Capacity of drive is from 1/2 to 4 hp. Electronic control panels can be mounted and integrated with other machine controls. Seal-pak construction of control panels gives protection from harmful atmospheres, vibration, and shock. *Reliance Electric & Engineering Co.*

... for more details, circle No. 228 on postcard

## OPEN-SIDE PRESS

... for plastics and rubber plants



"C" frame presses are a new addition to Pasadena Hydraulics line, which features rigid construction and precision ground platens with cast-in cooling coils and calrod heaters individually controlled by thermostats to 600 deg. F. Two-stage hydraulic pump provides quick closing and maximum pressure. *Pasadena Hydraulics, Inc.*

... for more details, circle No. 229 on postcard

## OIL-RESISTANT CONVEYOR BELT

... with no swell after long service

New belt made with nitrile synthetic rubber cover has greater resistance to penetration of vegetable and animal oils and fats. It is designed for use in food processing plants, feed mills, and textile mills. Two types: smooth top for horizontal hauling, and rough top for inclines and declines. *Hewitt-Robins, Inc.*

... for more details, circle No. 230 on postcard

# FOR BETTER WORK AT LOWER COST!

## Patterson - Kelley

BLENDING • PROCESSING  
HEAT TRANSFER EQUIPMENT

for the Chemical and Processing Industries



Standard "GD" Type  
Twin Shell Blender

Agitators  
Autoclaves  
Blenders  
Crystallizers  
Evaporators  
Fermenters

Heat Exchangers  
Jacketed Mixing Kettles  
Mixers—Kettles  
Pilot Plant Equipment  
Pressure & Vacuum Stills  
Reaction Vessels

Resin & Varnish Kettles  
Ribbon Mixers  
Soap Crutcheers  
Sprinkler Tank Heaters  
Twin-Shell Dry Blenders  
Waste Heat Reclaimers



Heavy Duty Reaction  
Vessel with Agitator

# FERNHOLTZ MACHINERY CO.

"Call Fernholtz First" for Complete Information

8468-W Melrose Place, Los Angeles 46, Calif.  
Olive 3-2360

... for more details, circle No. 31 on Reader Service Postcard



# BORN TO HANDLE HARD WORK!

"... a mighty man is he, with strong and sinewy hands." The village smithy provides a perfect analogy to the strength, stability engineered into

- 1 BERGER Steel legs for stability.
- 2 Laminated hardwood or masonite tops.
- 3 Or—BERGER rugged steel tops—baked enamel finish.
- 4 Made in variety of sizes to suit any special requirement.

## PETLEY WORK BENCHES



**OTHER PRODUCTS:**  
Steel shelving, tool room equipment, shop desks, lockers, office desks, files and tables.

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INCORPORATED  
TRADITIONAL AND AUTOMOTIVE EQUIPMENT EXPERTS

5424 E. Slauson Ave., Los Angeles 22  
Phone: RAYmond 3-3327

... for more details, circle No. 32 on Reader Service Postcard

## NEW STRADDLE CARRIER

... supports load with "arms"



Load hooks on this carrier will pivot inward, two forks on each side, and meet in center to form two arms under the load. Hydraulic cylinders control pivoting movement and vertical movement of hooks, actuated by two levers at driver's seat. Series 81 pivoted hook carrier has capacity of 20,000 lb., speeds up to 40 mph., 4-wheel steering, and 4-speed synchromesh transmission. Ross Carrier Division, Clark Equipment Co.

... for more details, circle No. 231 on postcard

## NEW PLASTIC PIPE

... resists fire and chemical attack

New type of plastic pipe, with trade name of Ryertex-Omicron PVC pipe, is recommended for industrial use because it will not support combustion and has maximum resistance to attack by various acids, alkalies, salt solutions, alcohols, and other chemicals. Pipe fittings and valves will also be available. Material can be sawed, threaded, solvent welded, and heat welded. Available in Schedules 40 and 80 pipe sizes. Joseph T. Ryerson & Son, Inc.

... for more details, circle No. 232 on postcard

## Magliner Dock Boards REFUSE to damage power truck tires

Magliner Tire-Saver Safety Curbs® (shown in circle below) prevent equipment run-off, eliminate costly tire damage and prolong dock board service-life!

Ordinary dock boards permit the rims of power truck wheels to bear against the side curb. These repeated contacts cause sharp, jagged edges in the curb itself. Magliner Tire-Saver Safety Curbs prevent this costly and dangerous condition. They are designed so that wheel rims cannot come into contact with the side curb and cause damage. As a result, expensive tire replacements are kept to a minimum and curbs last longer!

This exclusive advantage is one of the big reasons Magliner magnesium dock boards save you money both in initial cost, and in the long run. Let us show you how Magliners will speed traffic, reduce costs and insure greater safety in your operation.



WRITE TODAY  
For Bulletin DB-2041

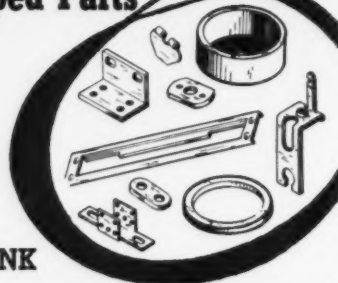
MAGLINE INC. • P.O. Box 712 • Pinconning, Michigan

... for more details, circle No. 33 on Reader Service Postcard

## TEMPORARY TOOLING

Specialized Small  
Irregular Shaped Parts

- ☒ STAMPED
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- ☒ PIERCED
- ☒ EXTRUDED
- ☒ STENCILLED
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- ☒ COUNTERSUNK



Years of tooling experience, combined with modern machines has proven over the past 20

NOW SERVING  
THE WESTERN STATES

**SHORT RUN**  
Stamping Co.  
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(A Suburb of Los Angeles)

years that the temporary die method is the most economical for model work and small production runs.

Send prints for firm quotation and detailed cost comparison.

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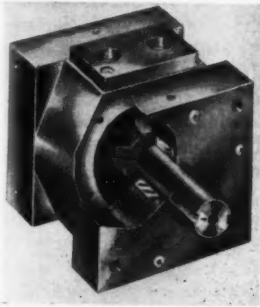
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WESTERN INDUSTRY — December 1955



## TORQUE MOTOR

... operates on air, oil, water, or other fluid pressures



Rotomation motor can obtain up to 280 deg. rotation of a shaft for turning, opening, closing, clamping, indexing, feeding, locking, pushing, mixing, or moving any type load or mechanism. Square shape utilizes minimum space in application. Complex linkage, gearing, transmissions, reduction gears, racks and pinions, levers, etc., are not required.

Rotomation motor is recommended for industrial machinery, machine tools, construction equipment, materials handling systems and devices, and all types of processing equipment—to supply torque mechanisms in a fraction of a second where required. *Roto-Motion Motors, Inc.*

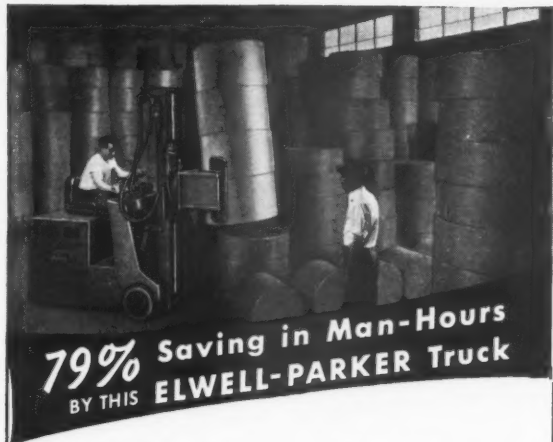
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## PRECISION SHIMMING

... with no bolts, no cement required

"Packaged Flats" contain one 9x18-in. sheet of Air-Loc machinery mounting material and one sheet of Air-Loc SL shim holding material, complete with installation instructions, at cost of about \$12. Contents are sufficient for setting up from one to three machines. *Clark-Cutler-McDermott Co.*

... for more details, circle No. 234 on postcard



**79% Saving in Man-Hours**  
BY THIS ELWELL-PARKER Truck

This E-P Clamp Truck moves 200 rolls of paper from Receiving Dock to Warehouse Storage in 10 man-hours. Previous manual methods took 48 man-hours to do the same job. Besides this big benefit, rolls can be stacked higher to save floor space. Paper spoilage is practically eliminated. The truck can carry and stack rolls either horizontally or vertically... Especially designed for handling paper rolls, these Elwell-Parker trucks can also transport many other cylindrical loads in varying diameters.

**WRITE FOR NEW FOLDER ON THE ELWELL-PARKER ROLL CLAMP TRUCK**

ELWELL-PARKER ELECTRIC CO. WESTERN REPRESENTATIVES:  
Los Angeles . . . J. W. LAFFERTY CO., 5422 E. Washington Boulevard  
San Francisco . . . IRA G. PERIN CO., 575 Howard Street  
Seattle . . . COLBY STEEL & MFG. INC., 3155 Elliott Avenue

... for more details, circle No. 35 on Reader Service Postcard

# How to save money on your private communications

Let's begin at the beginning. No matter what your communications requirements are—Teletype, private line telephone, radio telephone, signal and control channels—your capital is not tied up. And that's only the beginning of your savings with Pacific Telephone private communications systems.

A Pacific Telephone expert will see that the communications arrangements you get are tailored to your needs, yet easily rearranged if your requirements change. There'll be no idle equipment waiting for tomorrow's growth. There'll be no depreciation to worry about. No maintenance problems.

So, if you're planning a communications system, or if you want to improve the one you have, talk it over with the West's most experienced communications specialists. Their 75 years of know-how are at your disposal free and without obligation.



**Pacific Telephone**





The most effective dust, smoke, and fume arrestors in use today are made by REES

CLAY	COCOA	CARBON	ABRASIVE
COAL	CORK	CEMENT	ASBESTOS
FEED	FLOUR	CERAMIC	CHEMICAL
LIME	METAL	ENAMEL	FERTILIZER
ROCK	PAPER	FOUNDRY	LEATHER
SLATE	RUBBER	GRANITE	PLASTIC
SOAP	SILICA	GYPSUM	PORCELAIN
TALC	WOOD	PIGMENT	TOBACCO

REES BLOW PIPE MANUFACTURING CO., INC.

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5714 MORGAN AVENUE, LOS ANGELES • Lafayette 0191

**WRITE REES**

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# Rapistan®

**MATERIALS HANDLING EQUIPMENT**

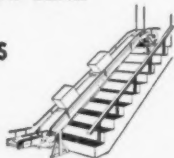


**GRAVITY CONVEYORS**

- Wheel & Roller
- Aluminum & Steel
- Flow Rack

**POWER CONVEYORS**

- Permanent Belt
- Portable Belt
- Overhead Chain



**INDUSTRIAL CASTERS & WHEELS**  
Cold-forged & Steel-forged

**LOCAL WEST COAST STOCKS**

LOS ANGELES E. A. Stevenson Co., Trinity 6905  
820 Santa Fe Ave., Los Angeles, California

SAN FRANCISCO Rapistan of California, Inc.,  
Yukon 2-3880, 444 Brannan St., San Francisco 7, Calif.

SEATTLE Air-Mac, Inc. of Washington, MU 3388,  
3838 4th Ave., S., Seattle 4, Washington

PORTLAND Air-Mac, Inc. of Oregon, Elmore 6524,  
1435 S.E. Union Ave., Portland 14, Oregon

... for more details, circle No. 38 on Reader Service Postcard

**TINY TOGGLE CLAMP**

... weighs 4 oz., has 150-lb. holding pressure



Here is a small-size edition of De-Sta-Co Model 225-U and 235-U clamps: the Midget-U. Though overall length in closed position is only about 5½ in., holding pressure of clamp is 150 lb. Split-second clamping action and release. Almost effortless positive clamping action should make this clamp particularly useful in metal, plastic, and wood production operations. *De-troit Stamping Co.*

... for more details, circle No. 235 on postcard

**ABRASIVE CUT-OFF WHEEL**

... combines faster speed with strength



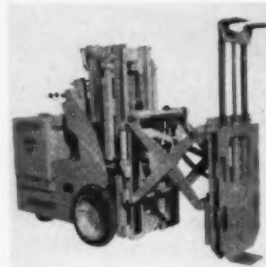
New bonds and bonding processes permit an increase in abrasive grain content and allow grains to be bonded in a porous construction, resulting in sharper, faster cutting action. Rough abrasive sides provide clearance to maintain wheel speed at best operating efficiency. The "muscle" needed for rugged work comes from reinforcing layers of high tensile

fabric. Recommended for steel, cast iron, and non-ferrous metals. Sizes available for all cut-off equipment. *Bay State Abrasive Products Co.*

... for more details, circle No. 236 on postcard

**EXTENDABLE CRATE CLAMP**

... reaches 24 in. and lifts 107 in.



Hydraulically controlled attachment for Automatic Skylift electric lift trucks can reach in and pick up a crated appliance from second tier in a boxcar or warehouse storage. Clamp has side shifting device permitting exact placement. Lift is 107 in. and clamp can reach 24 in. *Automatic Transportation Co.*

... for more details, circle No. 237 on postcard



**FOUNDRY PROBLEMS?**

Check

**CAST IRON**

Exclusively at

**DAYTON FOUNDRY**

Hollydale, Calif. • NEVada 6-1251

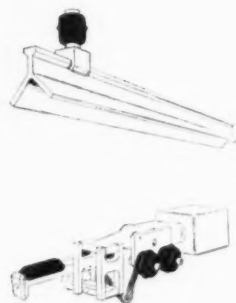
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WESTERN INDUSTRY — December 1955



## ALUMINUM CONDUCTORS

... can handle heavy current for overhead cranes



These conductors are heavy aluminum extrusions, with capacities of 300, 500, 1,000 amp. and larger. Special mounting hangers (see top sketch) permit conductors to float, removing need for expansion joints and eliminating strain on insulators. New type of sliding shoe collector with counterweight maintains constant pressure of shoes on side-mounted conductor bar (see lower sketch). Shoes are in

tandem and can be replaced by loosening one stud bolt for each. *Cleveland Crane & Engineering Co.*

... for more details, circle No. 238 on postcard

## LUBRICATION KIT

... especially for plant maintenance

Designed to save trouble, time, and losses, Gits Lubrikit is a conveniently boxed assortment of 95 oil cups of 29 different types, fully described on inside of box cover. Oilers are those most used for industrial maintenance and replacement according to Gits records. Introductory price \$14.95. *Gits Bros. Mfg. Co.*

... for more details, circle No. 239 on postcard

## FLUORESCENT-MERCURY LAMP

... good light even in dirt-laden atmosphere

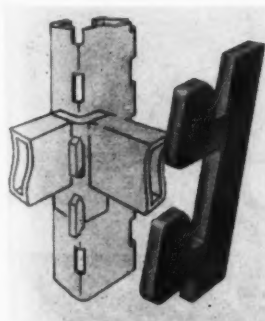


New 400-watt fluorescent mercury lamp of semi-reflector type (P-H1) is now offered by Westinghouse lamp division. Built-in reflector is said to result in as much as 20% increase in light per dollar of power cost, compared with ordinary lamps used with dirt-coated reflectors. Lamp can be installed in most existing fixtures for 400-watt mercury lamps. *Westinghouse Lamp Division*

... for more details, circle No. 240 on postcard

## STORAGE BINS

... use patented wedge lock for assembly

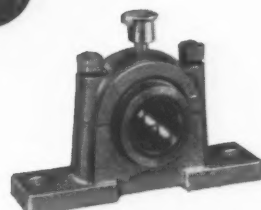


New steel Bulk Bins can be erected to meet storage needs of a single day, because of their fast set-up, expansion, disassembly, or relocation. Patented "Floating Wedge Lock" requires no nuts, bolts, screws, welding, or cross bracing. To form a section, all that is needed is four uprights, two top and bottom shelves, and eight floating wedge locks. *Sturdi-Bilt Steel Products, Inc.*

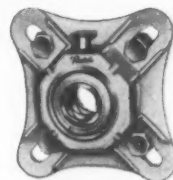
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SELF-LUBRICATING

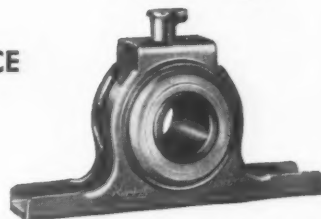


SELF-ALIGNING



EXCELLENT SERVICE

MINIMUM MAINTENANCE



LONG LIFE

There is a Randall self-aligning, self-lubricating pillow block for every application. See your distributor today for complete details.

### West Coast Distributors

Edward D. Maltby Co. .... Los Angeles, Calif.  
Allen J. James Co. .... San Francisco, Calif.  
Brown Bearing Co. .... Seattle, Washington  
Bearing Engineering & Supply Co. .... Seattle, Washington

BRONZE BAR STOCK

BRONZE BUSHINGS

PILLOW BLOCKS

SHEET LUBRICATOR

GRAPHITED BEARINGS

THRUST WASHERS

SAFETY COLLARS

BRONZE CASTING



**RANDALL GRAPHITE BEARINGS, INC.**

1011 S. Greenlawn Avenue, Lima, Ohio

... for more details, circle No. 40 on Reader Service Postcard



**HERE'S A GOOD WAY  
TO AVOID ALL DANGER  
OF OVER-PICKLING STEEL**



It is the safest way to remove rust, heat scale, flux and metallic smuts from steel that cannot be exposed to excessive attack by acid. It eliminates loss of metal, change of dimension on machined surfaces, chewing of threads and edges, hydrogen embrittlement and other dangers of over-pickling in acid.

This safe way employs a new alkaline cleaner that removes rust and heat scale at the same time that it removes oil, usually saving time and money.

**FREE** For illustrated booklet "Here's the best shortcut in the field of electroplating", write Oakite Products, Inc., 1001 E. First St., Los Angeles, or 681 Market St., San Francisco, Calif.

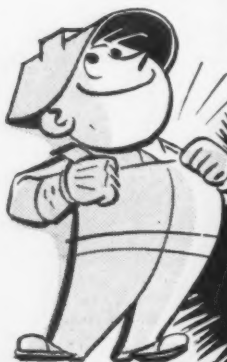


Technical Service Representatives in Principal Cities of U.S. and Canada

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**1940-1955  
OUR 15th YEAR  
OF PROGRESS ... 15 YEARS OF  
CONTINUED IMPROVEMENT  
OF ALL OUR SERVICES ...**



**and now ...  
ARGON  
99.99% pure!**

Manufacturers  
of  
**OXYGEN  
ACETYLENE  
HELIUM  
MEDICAL  
GASES  
NITROGEN  
and  
99.99%  
PURE ARGON**

**INDUSTRIAL  
AIR PRODUCTS CO.**

PORTLAND • SPOKANE • SEATTLE  
YAKIMA • MEDFORD • KENNEWICK

... for more details, circle No. 42 on Reader Service Postcard  
52

## FORK LIFT TRUCKS

... giant units for oversize loads



Gerlinger "H" series fork lift trucks are designed for handling oversize loads of steel, concrete pipe, lumber, etc., with no sacrifice in maneuverability of truck. Available in 32,000-, 36,000-, and 40,000-lb. capacities. As an example, full kiln load of logs—too unwieldy for single-load handling with ordinary equipment—is possible with "H" truck. Gerlinger Carrier Co.

... for more details, circle No. 242 on postcard

## VAPOR DEGREASER

... uses solvent heated by steam generator



New G/S type of vapor degreaser incorporates a small gas-fired Malsbary steam generator which heats the solvent through steam coils submerged in degreaser tank. Water for generator is taken from degreaser condenser jacket, at temperatures of about 100 deg. F., using heat which would otherwise be wasted.

One valve starts and stops equipment, which is completely automatic. Steam jet is provided for precleaning parts or cleaning out degreaser. Currier Co.

... for more details, circle No. 243 on postcard

**SULPHURIC ACID  
for the west  
66° BAUME 20%  
98% OLEUM  
and special grades**

**Garfield**

700 PACIFIC NAT'L BLDG.  
SALT LAKE CITY, UTAH

**CHEMICAL  
& MFG. CORP.**

ESTABLISHED  
1916

... for more details, circle No. 43 on Reader Service Postcard  
WESTERN INDUSTRY — December 1955



## HEAVY-DUTY TRACKMOBILE

... travels on both road and track,  
can move six loaded freight cars at once



New heavy-duty Trackmobile is designed for use on factory sidings, mines, grain storage depots, and other industrial trackage in switching and spotting cars, pulling loaded rail cars, and making up strings of cars. On a track, automotive type road wheels are retracted and vehicle travels sideways on steel rail wheels. Conversion to pneumatic road wheels takes only 90 sec. Trackmobile can develop as high as 12,800 lb. of draw-bar pull. All controls are located in cab. *Whiting Corp.*

... for more details, circle No. 244 on postcard

## DIE OILER

... uses same oil over and over again

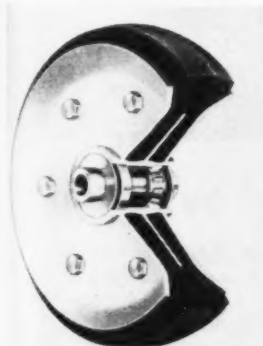


Ridgoilr (Ridge oiler) consists of a 15 in. wide chip pan in an oil reservoir with carrying bail, from which a screened hose connects with a hand-operated oil pump-gun. Pan is placed under work, catching oil, chips, and cut-offs and allowing an endless stream of clean oil to flood dies while work is in progress. More than 95% of oil is saved and reused. *Ridge Tool Co.*

... for more details, circle No. 245 on postcard

## NEW-TYPE RUBBER-TIRED WHEELS

... move heavy loads with ease



Rubber tread on this new "self-energizing" wheel is bonded vertically between two steel disks in such a way that it resists flattening under heavy loads. Further, bonded surface will not break loose. Engineering details are available from manufacturer. *Roll Rite Corp.*

... for more details, circle No. 246 on postcard

Use **REMA** to add  
years of life to  
your Belts

**REMA** is the  
New and Amazing  
Self-Vulcanizing  
Rubber Repair  
Material



**REMA**

REQUIRES

- NO HEAT
- NO HEAVY EQUIPMENT
- NO CURING TIME DELAY

▼ REMA is not just another cold patch. REMA is vulcanization by chemical process. No heat or heavy vulcanizing equipment required. Here's the astonishing advantage — when repair work is completed belts may be returned to service immediately.

▼ REMA seals out moisture, reduces mildew, rot and deterioration — the great enemies of conveyor belts. Your own maintenance man can quickly repair your belts.

▼ Available in introductory kits or parts separately. Order from your Flexco-Alligator distributor. Write for Folder No. R4

FLEXIBLE STEEL LACING CO., 4642 Lexington Street, Chicago 44, Illinois

**REMA**

SELF-VULCANIZING

RUBBER REPAIR MATERIALS

... for more details, circle No. 44 on Reader Service Postcard

... the Quality Line

**STEEL Stanho PRODUCTS**

**Stainless Steel TAPER PINS**

Complete stock, all sizes #7/0 through #14.  
Special sizes to order.  
Milled or Centerless Ground (Precision Type).  
Made to accurate tolerances.

Also "Stanho" Taper Pins made from selected screw stock, Monel, Brass, Aluminum or other metals. Clean bright finish — prompt shipments.

Write for description and prices.

**STANDARD**  
Since 1872  
**HORSE NAIL CORP.**  
NEW BRIGHTON PA

JM-6

Western Factory Sales Representative

GRETH & GRETH, P. O. Box 47, Stockton, California

... for more details, circle No. 45 on Reader Service Postcard



# TRADE WINDS

News for you about suppliers  
of plant operating equipment



## New Denver warehouse for Fort Worth

Fort Worth Steel & Machinery, Dallas, Texas, has fully opened its Denver, Colo., distribution warehouse and sales office. *Earl Baker*, Rocky Mountain district manager for the firm, heads up the Denver facility, which encompasses a 5,000-sq. ft. area.



*Earl Baker*, Rocky Mountain district manager, Fort Worth Steel & Machinery Co., Denver, Colo.

Warehouse stock includes Fort Worth equipment in a wide range of sizes and for use in oil production, mining, cement production, bulk grain handling, and general manufacture. Fort Worth Steel & Machinery products include V-belt drive equipment, roller-chain drives and other power transmission items, screw conveyors and other materials handling items, and specialized machinery for the vegetable oil extraction industry.

Colorado, Montana, Utah, Wyoming, and parts of North and South Dakota, Idaho, and New Mexico will

be served from the new Denver facility.

Firm has also recently appointed Power Transmission Products, Portland, Ore., division of Portland Iron Works, as distributor of Fort Worth products in the Northwest.

## Progress report on distributors' organization

*J. P. Hamerslag, Jr.*, of Hamerslag Equipment Co., San Francisco, is picked as director for a newly established Region 13 (northern California and Nevada) of the Material Handling Equipment Distributors Assoc. This was part of a redistribution of regions approved by the board of directors of the association, which now has a membership of 100. President is *Robert H. Braun*, Los Angeles.

## Garrett Supply adds Jergens line

Donley Products, Inc., of Cleveland, Ohio, names Garrett Supply Co. of Los Angeles as distributors of Jergens live pilot bearing bushings, used in piloting applications on radial drill presses, boring mills, and milling machines. Garrett Supply is a division of The Garrett Corp., also Los Angeles.

## Hollabaugh to add Pacific pipe fittings

Pacific Fittings division of General Metals Corp., Hollydale, Calif., has appointed Roy Hollabaugh Co., Portland, Ore., as its representative in the state of Oregon, handling complete line of Pacific pipe fittings.



## Western warehouse opened by Nutting

Nutting Truck and Caster Co., Fari-bault, Minn., has opened new warehouse facilities in Oakland, Calif., to service users of materials handling equipment in the West. *Clayton E. Johnson*, former assistant traffic man-

ager for the company, has been appointed manager of the new Western outlet.

Located at 2527 Magnolia St., Oakland, the new building of brick construction contains over 4,000 sq. ft.





Clayton E. Johnson,  
Western manager,  
Nutting Truck & Caster  
Co., Oakland, Calif.

floor space. A complete stock of floor trucks, casters, wheels, and replacement parts, plus maintenance and repair service facilities, will be maintained in the new facility. Nutting representatives in Denver, Los Angeles, Portland, Seattle, Spokane, and Tucson will be served from the new location.

### White-Autocar expands in San Jose

A 7,000-sq. ft. office building, 1,200-sq. ft. parts room, modern maintenance shop with new equipment, and 30-ft. outside lube pit are among the improvements recently added to White Motor Co.'s White-Autocar distributorship in San Jose, Calif. Jack Lambrecht is in charge of San Jose installation.

## REPAIR CONCRETE FLOORS

AND USE THEM IN 45 MINUTES

### WITH **Kwik-Roc!**

Now you can repair cracks and holes in concrete floors while the plant is out to lunch. Use KWIK-ROC. It makes a floor patch that sets to rock-like hardness within 45 minutes of application. No need to hold up or detour plant traffic. When lunch is over it's all ready to use and abuse. Write Dept. H8-1256 for prices and detailed information.



### A. C. Horn Co., Inc.

252 Townsend St., San Francisco, California

#### DIVISIONS OF SUN CHEMICAL CORPORATION

**HORN • HUDSON • WILEY** (paints, maintenance and construction materials, industrial coatings) • **WARWICK** (textile and industrial chemicals) • **WARWICK WAX** (refiners of specialty waxes) • **RUTHERFORD** (lithographic equipment) • **SUN SUPPLY** (lithographic supplies) • **GENERAL PRINTING INK** (Sigmund Ullman • Fuchs & Lang • Eagle • American • Kelly • Chemical Color & Supply Inks) • **MORRILL** (news inks) • **ELECTRO-TECHNICAL PRODUCTS** (coatings and plastics) • **PIGMENTS DIVISION** (pigments for paints, plastics, printing inks of all kinds)

... for more details, circle No. 46 on Reader Service Postcard

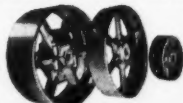


## Faster Service on **DEPENDABLE Dick Power Transmission and Conveying Equipment**

### 3 CONVENIENT WEST COAST SERVICE CENTERS

FACTORY SALES REPRESENTATIVES FOR *Atlas Roller Chain • Sewall Roller Chain Sprockets*

#### BARRY STEEL SPLIT PULLEYS



Scientifically designed. Electrically welded. Light weight. Easily installed. Maintain exact shape under all loads.

#### DICK ROPE QD SHEAVES

Heavy duty "quick-demountable." On or off shaft in minutes. No wobble or loss of balance. 802 stock sizes fit over 25,000 stock drive combinations from 1/2 to 600 hp. Also . . . stock V-Belt drives and "special" sheaves for every application.



#### DICK'S BALATA BELTING



Hard surface, closely woven duck, thoroughly impregnated with Balata Gum. Free from stretch and shrinkage. Moisture resistant. High transmission efficiency.

#### BARRY CONVEYOR PULLEYS

Light weight combined with super strength. Welded steel construction. Easily installed. Wide range of sizes for all general conveyor services.



3 Convenient West Coast Service Centers

**R. & J. Dick COMPANY, INC.**  
PASSAIC • NEW JERSEY

MAYWOOD (Los Angeles)  
5276 Atlantic Blvd.  
LOgan 8-4014

SAN FRANCISCO 7  
510 Bryant St.  
SUtter 1-1341

SEATTLE 4  
307 Maritime Bldg.  
MUT.al 1922

... for more details, circle No. 47 on Reader Service Postcard



GEARS FOR INDUSTRY  
**THE Lufkin LINE**  
OIL FIELD PUMPING UNITS

## DID YOU KNOW . . .

that . . .

Lufkin Foundry and Machine Company is the world's foremost manufacturer of Herring Bone Gearing oilfield pumping units?



V. J. Fawcett

Lufkin Foundry and Machine Company's home office and plant at Lufkin, Texas, is located in the Southern Timber Belt . . . a beautifully wooded section of East Texas . . . sometimes termed the "Piney Woods" country, where forests of Loblolly and Long Leaf Pine thrive?

Lufkin Foundry and Machine Company is the home of "Lufkin Gears for Industry" . . . built to meet the specifications of Industry's most discriminating engineers and to endure under the most severe types of service which can be imposed?

Coon hunters consider Lufkin a "Piney Woods Paradise" and they say that some of the greatest coon hunting in the world is within 15 minutes of the city limits?

Lufkin Foundry and Machine Company has nothing to do with the restaurant business, but maintains a little hunting club out at Piney Ridge where the cook and his helpers dish out some of the finest Southern Cooking you ever shook a corn pone at . . . m-m-m . . . fried catfish, black eyed peas and turnip greens . . . You all come!

Lufkin Foundry and Machine Company maintains factory sales and service offices throughout the U. S. and serves Canadian oil fields through its subsidiary, Lufkin Machine Company, Ltd. at Edmonton.

*V. J. Fawcett*

**Lufkin FOUNDRY**  
& MACHINE COMPANY

PACIFIC COAST DIVISION

5959 S. Alameda St., Los Angeles 1, Calif.

NORTHWEST SALES AND SERVICE

J. W. Minder Chain and Gear Co.

307 So. East Hawthorne Blvd.

Portland, Ore.

Dallas

Lufkin, Texas

New York

. . . for more details, circle No. 48

## New California dealers for Clark Equipment

Industrial truck division of Clark Equipment Co., Battle Creek, Mich., has named two new dealers in California to sell and service its industrial fork trucks, straddle carriers, and powered hand trucks. Warner-Yates Co. of San Jose will represent Clark in San Mateo, Santa Clara, Santa Cruz, San Benito, and Monterey counties. J. R. Rolfe Equipment Co., Sacramento, will handle Clark line in counties of north central California and parts of Nevada.

## Westates Steel holds open house

Westates Steel Co., subsidiary of Caspers Tin Plate Co. of Chicago, inaugurated new facilities on De La Cruz Blvd. in Santa Clara, Calif., with an open house which was attended by representatives of steel trade, visitors from parent company, and business press. Warehouse stocks steel items for industrial building, manufacturing, and maintenance, and is equipped with shear and saw cutting machines and pantograph machine with six cutting torches.

**PIPE**  
**1/8" thru 30"**

**'FASTER FROM FOSTER'**

**TESTED AND STRUCTURAL**

- SPIRAL WELD • SEAMLESS
- ELECTRIC WELD • LAP WELD
- BUTT WELD • CONTINUOUS

**Complete Warehouse Stocks FOR EVERY NEED**

Call Foster for all your Steel Pipe. You'll get fast dependable service from pipe specialists, with Shop Facilities for every type of Fabrication.

SEND FOR CATALOG WI-12

RAILS - TRACK EQUIPMENT - PIPE - PILING

**L.B. FOSTER CO.**

PITTSBURGH 30 • NEW YORK 7 • CHICAGO 4  
ATLANTA 8 • HOUSTON 2 • LOS ANGELES 5

3460 Wilshire Blvd., Los Angeles 5

. . . for more details, circle No. 49

Is the

## Protection You Buy TIME-TESTED Like

**TAPECOAT**

## . . . the Quality Coal Tar Coating

There is one dependable yardstick for measuring the quality of protective material: How does it stand up over years of service?

You don't have to experiment when you specify TAPECOAT. It is quality coal tar coating, and coal tar is nature's own defense against corrosion.

Since 1941, when it was introduced as the first protective coating in handy tape form, TAPECOAT has proved its ability to keep vulnerable steel surfaces in "like new" condition year after year. That's why it is specified by those who know that continuing protection is the first consideration.

For 14 years, TAPECOAT has provided dependable protection on pipe, pipe joints, tanks, etc., above ground and under ground.

TAPECOAT comes in handy rolls in widths from 2" to 24". It's easy to apply and the coal tar provides both bond and protection at the same time.

Write for brochure and recommendations on your corrosion problem.

**The TAPECOAT Company**

Originators of Coal Tar Tape Protection

1563 Lyons Street • Evanston, Illinois

. . . Visit us in Booth 1118 at the Plant Maintenance & Engineering Show, Philadelphia, January 1956

. . . for more details, circle No. 50

WESTERN INDUSTRY — December 1955



## Denver branch for Rockwell Manufacturing Co.

Orville Cochran has been named branch manager of new Denver office recently opened by Rockwell Manufacturing Co.'s Meter and Valve divi-



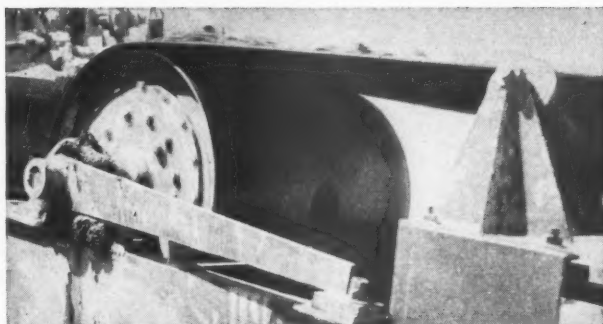
Orville Cochran, branch manager, Rockwell Manufacturing Co., Denver, Colo.

sion. Mr. Cochran joined the company in 1922, and except for eight years in Kansas City district, has been serving the Rocky Mountain territory.

## West Bend adds three distributors

West Bend Equipment Co., West Bend, Wis., has three additional distributors now serving the Western states: P. F. O'Donnell Co. in San Francisco; Urban M. Lodge Co., Denver; and Stryco Sales, Inc., Albuquerque, N. M.

"The Head Pulley with Motor Inside." Safe, compact, simple—no chains, no belts, no sprockets, no exposed motors.



Built by Yuba for sale in Arizona, California, Idaho, Montana, Nevada, New Mexico, Oregon, Texas, Utah, Washington.

Built and sold in other states by Iowa Mfg. Co., Cedar Rapids, Iowa.

## IF YOU USE BELT CONVEYORS OR BUCKET ELEVATORS SAVE SPACE, CUT DOWNTIME with YUBA-SCHROCK HEAD PULLEY

All moving parts fit compactly inside pulley shell, protected against weather and dirt, thus practically eliminating pulley troubles. This pulley with motor inside requires no more

room than an idler pulley; can be installed quickly. Diameters 10½" to 56". ⅓ to 125 hp. for voltages to 2300. Job proved. Write TODAY for folder and name of nearest distributor.



## YUBA MANUFACTURING CO.

82

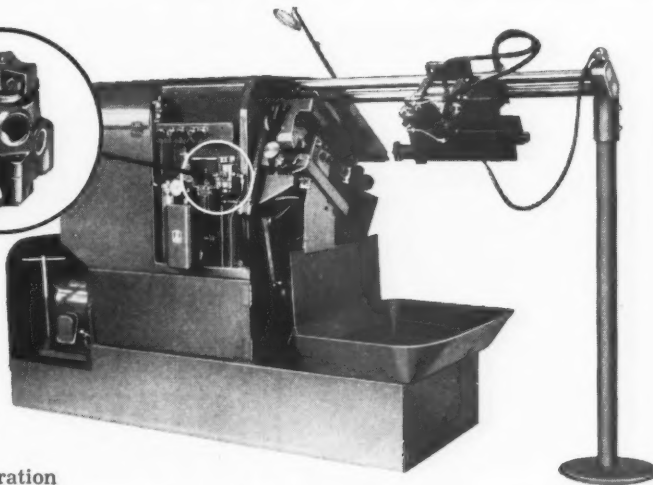
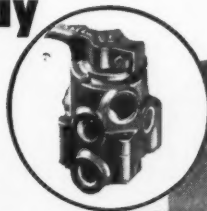
Pulley and Sprocket Dept.

PHONE 628

BENICIA, CALIFORNIA

... for more details, circle No. 51 on Reader Service Postcard

## NOPAK Dual 4-Way is Main Air Control on "Modern" Cutting-Off Machine



Modern Machine Tool Co., Jackson, Mich., uses the NOPAK Dual 4-Way valve as the "main air control valve" on its Cutting-Off Machine for these reasons:—

1. It provides the necessary sequence of operation control.
2. It is "easily mounted . . . in readily accessible position".
3. It directs air pressure either to part of the air system, or the whole system, as required.
4. With valve lever at 45°, "the operator can set the tools, with a gauge, against the stock while it (the stock) is locked in the collet".
5. In normal running position with valve lever at 90°, air is directed to other parts of system, while maintaining pressure on collet cylinder during cutting cycle.

This application may suggest how you can use NOPAK Valves and Cylinders for effective control and application of fluid power in your

product, or in your plant equipment.

## GALLAND-HENNING NOPAK DIVISION

2749 S. 31st St.

Milwaukee 46, Wisconsin

The Willard Engineering Co., 2703 So. Hill St., Los Angeles 7, California  
Transmission Engineering Co., 53 Stevenson St., San Francisco 5, California  
Caldwell Machinery Co., 58 S.W. Oak St., Portland, Oregon  
E. C. Griffin Co., 524½ First Ave., So., Seattle 4, Wash.

John F. Woodhead, c/o Sales Engineering Co., 529 W. 8th St., South, Salt Lake City, Utah  
Western Machinery Co., No. 808 Division St., Spokane 11, Washington

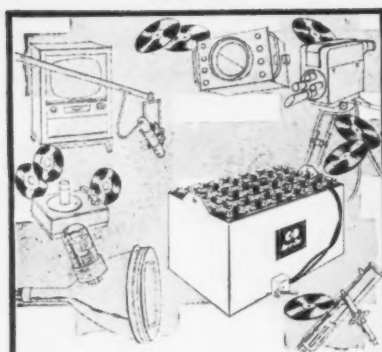
# NOPAK

® VALVES AND CYLINDERS  
DESIGNED for AIR and HYDRAULIC SERVICE

... for more details, circle No. 52 on Reader Service Postcard

57





## at RCA— C&D Industrial Batteries for **EXTRA** work

RCA, pioneer and leader in the development of the phonograph, radio and television, has brought pleasure and entertainment to countless millions all over the world. Naturally, RCA uses thousands of tons of materials of all kinds to make its famous products. To help solve its materials handling problems, RCA uses C&D Slyver-Clad\* batteries as one of its major sources of power for its industrial trucks employed in daily operations. For RCA, like hundreds of other important companies, has found it pays to power with C&D Slyver-Clad batteries.

C&D Slyver-Clad batteries are approved as standard equipment by all electric truck manufacturers. For further information, write for Catalog.

\*T.M. Reg.



**BATTERIES, INC.**  
*of Conshohocken, Pa.*

Manufacturers of Industrial Batteries since 1906

Sales and Service Offices  
in Principal Cities from Coast to Coast

Export Division:  
1014 Scheff Building, Philadelphia 2, Pa.

... for more details, circle No. 53

## Century Electric opens Spokane office

New district office, headed by *B. J. Gill*, has opened in Spokane, Wash., for Century Electric Co. of St. Louis, Mo. Mr. Gill, who was formerly with



**B. J. Gill**, district manager, Century Electric Co., Spokane, Wash.

Century Electric agency in Spokane, will be assisted in serving Northwest area by *Ralph Price*, manager of Seattle office. New district office will have complete warehouse stock of Century motors for supplying Idaho, western Montana, Oregon, and Washington.

## Ohio Brass names two valve sales reps

*C. S. Bigelow & Assocs.*, Los Angeles, has been appointed to represent Ohio Brass Co. in southern California and southern Nevada areas. Associ-

## Take the Back-breaking LIFT out of the Heavy Jobs



A Heavy Duty Table with Electric or Manual Control for loads to 10 tons.

## Weld-Bilt HYDRAULIC LIFT TABLES

You don't need "muscle-men" for heavy dies, sheet steel, or big machined parts with WELD-BILT Hydraulic Tables. Just adjust Table to loading height, slide parts on easily. Then move to machine position, raise or lower to working height.

Write for latest bulletins and prices.

### SALES REPRESENTATIVES:

#### SAN FRANCISCO:

P. F. O'Donnell Co., 2298 Jerrold Ave.

#### SO. CALIFORNIA and ARIZONA:

Keville Industrial Service

P. O. Box 1049, Pomona, Calif.

#### WASHINGTON and OREGON:

Hallidie Machine Co.

Seattle: 210 Hudson St.

Spokane: N. 2-605 Division St.

Tacoma: 200 Floral Bldg.

Portland: 1545 S. E. Union St.

## WEST BEND EQUIPMENT CORP. MATERIALS HANDLING ENGINEERS

307 West Water Street, West Bend, Wis.

... for more details, circle No. 54

## ONE MAN Does the Work of 15 with this WISCONSIN- POWERED HYSTER "20" Lift Truck



As a manual handling "back-breaker", this job is "all wool and a yard wide"... lifting and stacking baled wool weighing 1000 to 1200 lbs. per bale. The 30-inch load arms of this Hyster Truck and the rugged, dependable power supplied by the Wisconsin Heavy-Duty Air-Cooled Engine make this an ideal operation for *one man*, doing the work that formerly required 15 huskies, at the same time reducing possibilities of accident and injury.

This is another typical materials handling assignment that is a "natural" for Wisconsin Air-Cooled Engines because of their inherent Lugging Power, heavy-duty engineered design and construction and foolproof AIR-COOLING.

You can't do better than to specify "Wisconsin Power" for your equipment.



## WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines

MILWAUKEE 46, WISCONSIN

... for more details, circle No. 55 on Reader Service Postcard



ated Valve & Engineering Co., San Francisco, headed by *Jacques P. Etienne*, was selected to represent company in San Francisco and Reno area. Mr. Bigelow formerly was associated with Walworth Co. and served as sales manager of Milwaukee Valve Co. Mr. Etienne was previously employed as a refrigeration engineer by Cyclops Iron Works.

## MEN OF THE TRADE IN THE NEWS . . .

### Earle M. Jorgensen Co.

. . . names *W. W. Fenstermacher* assistant district manager at San Francisco plant distributing steel and aluminum products. He joined Jorgensen in 1945 and advanced to outside salesman in 1948.

### Hyster Co.

. . . promotes *Harold R. Lucas* to position of manager of a new merchandise division in general sales department. He has been serving as administrative assistant in general sales for past six years.

### Pacific Fittings Division General Metals Corp.

. . . appoints *William A. Flood* sales manager at company headquarters in Hollydale, Calif. For past ten years he has been a partner in firm of Benedict & Benedict, plumbing and heating contractors, Pasadena.



When you need tubular rivets, you want them GOOD and you want them FAST. 5 Milford plants and 20 Milford offices see that you always get BOTH!

**THE  
MILFORD  
RIVET & MACHINE CO.**

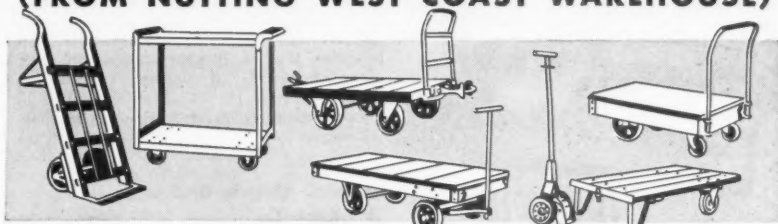
Plants: Milford, Conn.; Norwalk, Calif.; Elyria, Ohio; Aurora, Ill.; Hatboro, Pa.  
Offices: Atlanta, Chicago, Cleveland, Detroit, Fort Worth, Indianapolis, Newark, New York, Pittsburgh, Racine, St. Louis, St. Paul, San Francisco, Seattle, Norwalk, Calif.; Stratford, Conn.; Charlotte, N. C.; Seneca Falls, N.Y.; Jenkintown, Pa.; Westwood, Mass.

**Headquarters for RIVETS**  
Tubular, solid, and cold-formed  
and Rivet-setting Machines

. . . for more details, circle No. 56

December 1955 — WESTERN INDUSTRY

# FASTER DELIVERY (FROM NUTTING WEST COAST WAREHOUSE)



**OVERNIGHT DELIVERY** to most areas of the most popular models and sizes of Nutting Floor Trucks, Casters and Wheels.

**FACTORY CARLOAD SHIPMENTS** at regular intervals reduce your freight expense and provide adequate replacement of stock items.

WRITE—WIRE—OR PHONE

YOUR NEAREST

*Nutting*

REPRESENTATIVE

**OAKLAND**  
E. C. Buehrer Associates, Inc.  
351 5th Street  
Phone: TEMPLEBAR 6-2082

**PORTLAND**  
F. E. Bennett Company  
426 N. W. 6th Avenue  
Phone: CAPITOL 8-2321

**SEATTLE**  
Secord Sales Company  
95 Connecticut Street  
Phone: MAIN 0737

**TUCSON**  
L. J. Clarke & Company  
2625 N. 1st Avenue  
Phone: 4-6233

**LOS ANGELES**  
H. L. Stewart & Associates  
1547 Estudillo Avenue  
Phone: ANGELES 1-2194

**PHOENIX**  
L. J. Clarke & Company  
18 East Lincoln Street  
Phone: ALPINE 4-1754

**SALT LAKE CITY**  
Equipment Supply Co.  
16 Post Office Place  
Phone: 3-9074

**SPOKANE**  
H. H. McVeigh  
West 310 First Avenue  
Phone: RIVERSIDE 5927

Since  
1891

**NUTTING TRUCK AND CASTER COMPANY**

1726 DIVISION STREET

FARIBAULT, MINNESOTA

. . . for more details, circle No. 57 on Reader Service Postcard

## MORE HELP with your PUMPING PROBLEMS

### NEW 40 page VIKING Engineering Manual

A new 3-part, 40-page engineering manual including Viking rotary pump fundamentals, the 10 steps in selecting a Viking pump, and a special engineering section will help you in choosing the right rotary pump for your job.

This manual is free upon request. Write today for Manual Ka.



**VIKING PUMP CO.**

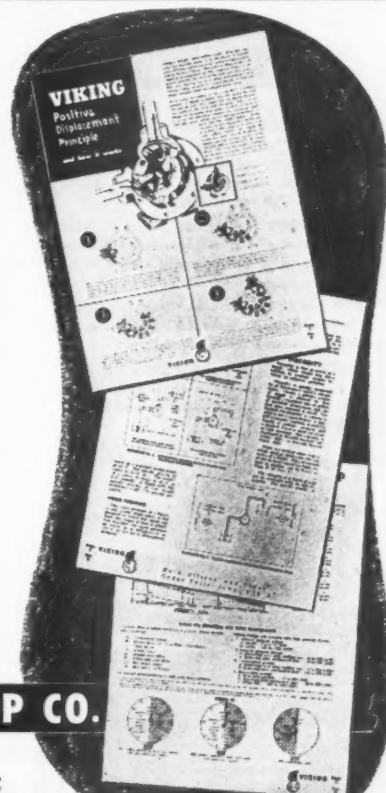
Cedar Falls, Iowa

See our catalog in SWEETS

Pacific Coast Distributors

E. E. Burton, 4432 Long Beach Ave., Los Angeles 58, Calif.  
DeLaval Pacific Company, 201 E. Millbrae Ave., Millbrae, Calif.

. . . for more details, circle No. 58 on Reader Service Postcard





wherever the need...  
whatever the size...

**DARNELL**  
Casters & Wheels

...QUICKLY  
RETURN THEIR COST!



4 REASONS WHY  
DARNELL CASTERS  
ARE BEST

**RUBBER TREADS** . . . a wide choice of treads suited to all types of floors, including Darnelloprene oil, water and chemical-resistant treads, make Darnell Casters and Wheels highly adapted to rough usage.

**RUST-PROOFED** . . . by the Udylite process, Darnell Casters give longer, care-free life wherever water, steam and corroding chemicals are freely used.

**STRING GUARDS** . . . Even though string and ravelings may wind around the hub, these string guards insure easy rolling at all times.

**LUBRICATION** . . . all swivel and wheel bearings are factory packed with a high quality grease that "stands up" under attack by heat and water.



WRITE  
for this new  
**DARNELL  
MANUAL**

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#### Western Insulated Wire Co.

... names new sales and engineering personnel at its Los Angeles headquarters. *Edwin B. Kanner*, who has been with the company for two years, becomes sales manager. *Murray H. Owen*, former sales manager, now occupies post of director of customer relations. *James W. Broughton* is appointed chief engineer. He has been employed in field of wire and cable engineering for past 15 years.

#### Warner Electric Brake & Clutch Co.



R. Whitson

#### Chiksan Co.

... names *Arthur C. Edwards* field engineer, to provide technical assistance to customers in fields of aircraft, petroleum, and general industry. He has been with this Brea, Calif., company since 1946 and was appointed senior salesman for field engineering in 1948. Mr. Edwards succeeds *H. J. Schlarb* in Los Angeles area.



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WESTERN INDUSTRY — December 1955



# WESTERNERS AT WORK



J. J. Carlson



B. J. Osborne

## Kaiser Steel Corp. Oakland, Calif.

Jack J. Carlson, who has been with company since 1944, is appointed a vice president of Kaiser Steel and general manager of Montebello, Calif., fabricating division plant. He advances from position of assistant to vice president and general manager at Oakland home office.

B. J. Osborne, former general manager of plant, moves to home office as assistant to vice president and general manager for consultation on fabricating division operations. He has been with Kaiser Steel since 1947.

A. F. Scarr is named assistant to vice president and general manager, succeeding Mr. Carlson. He has served since 1953 as assistant to vice president in charge of operations, and has been with company since 1946.

## Berkeley Division Beckman Instruments, Inc. Richmond, Calif.

Donald C. Duncan is appointed general manager of Berkeley division of this company, and Thomas Allinson is named manager, reporting to Mr. Duncan, who will continue to serve as general manager of Helipot and Arga divisions of company in South Pasadena. Mr. Allinson joined Berkeley in 1951 as plant manager and since 1954 has been serving as marketing manager.

## United States Steel Corp.

Pittsburg, Calif., and Provo, Utah

George A. Jedenoff is named assistant general superintendent at Pittsburg works of Columbia-Geneva division, succeeding Robert B. Freeman, who moves to Gary, Ind., as assistant general superintendent of U. S. Steel's sheet and tin mill. Mr. Jedenoff, who started with company in 1942, has been superintendent of cold reduction at Pittsburg since August of this year.

R. L. Dowell, former assistant superintendent of maintenance, advances to post of assistant to general superintendent at Pittsburg works. E. C. Kinyon, former superintendent of wire and wire products, moves up to superintendent of sheet finishing. J. P. Newman, who has been superintendent of sheet finishing since 1952, becomes superintendent of cold reduction. E. L. Slagle, works industrial engineer, advances to superintendent of wire and wire products. W. W. Tryon succeeds Mr. Slagle as works industrial engineer, moving up from assistant's post.

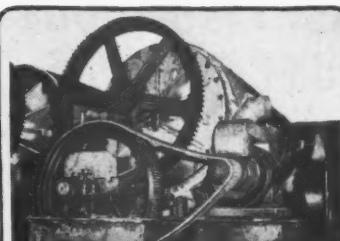


G. A. Jedenoff



Leonard Tofft

Leonard Tofft is appointed division superintendent of blast furnaces at Geneva works of Columbia-Geneva Steel division, Provo, Utah. He succeeds Harold B. Makin, deceased. Mr. Tofft, who has been with company since 1937, moved to Geneva works in 1947 as assistant superintendent of blast furnace and in 1952 advanced to superintendent.



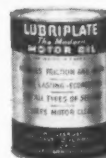
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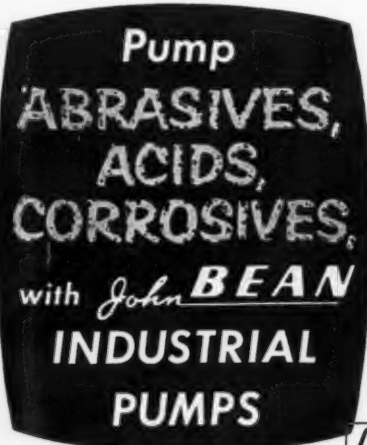
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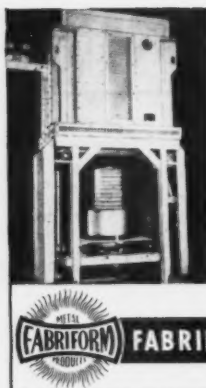
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## McCulloch Motors Corp. Los Angeles

Robert Astle, who joined this company in 1950 and was assigned to industrial engineering department in 1953, is named assistant chief industrial engineer.

## Calstrip Steel Corp. Los Angeles

William S. Long joins this company as vice president in charge of operations. He was formerly with United States Rubber Co. as operations manager at their Los Angeles plant and later as Western division manager of mechanical goods division.

## Stanford Research Institute Menlo Park, Calif.

New associate industrial engineer at SRI is Bradford W. Brown, packaging and materials handling specialist formerly of Milwaukee, Wis. He will work on research program allied to fields of operations, markets, and transportation.

## General Electric Co. Richland, Wash.

R. J. Schier is appointed manager, purchasing and stores, for Hanford atomic plant, replacing R. J. Gandy, who has transferred to San Jose headquarters of project for design and construction of atomic reactor for Commonwealth Edison, on which GE is prime contractor. Mr. Schier, former manager of engineering administration, joined company at Hanford in 1947.

## Kennecott Copper Corp. Salt Lake City, Utah

C. D. Michaelson, vice president formerly in charge of Kennecott's subsidiary in Chile, Braden Copper Co., becomes general manager of Western Mining divisions, with headquarters in Salt Lake City. He will supervise operations in Utah, Nevada, Arizona, and New Mexico. J. P. Caulfield, who formerly held this position, moves to executive offices in New York City as assistant to Frank R. Milliken, vice president.

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# THE West ON ITS WAY

NEW PLANTS, EXPANSIONS, NEW INDUSTRIES, PRODUCTION CONTRACTS,

DEVELOPMENT PROJECTS, UTILIZATION OF RESOURCES

## HIGHLIGHTS . . . read details under state headings

Kennecott plans \$4,750,000 plant to get more copper per ton (p. 63)  
Container Corp. plans \$6,300,000 plant in Santa Clara, Calif. (p. 63)  
\$6,000,000 expansion for B. F. Goodrich in Los Angeles (p. 63)  
North American establishes Atomics International division (p. 63)  
Building permits up 52% for entire West (p. 66)  
American Gilsonite awards two building contracts in Colorado (p. 69)  
Montana Sulphur and Chemical Co. new Billings plant (p. 69)  
Vitro Uranium negotiates with AEC for 70% expansion of Utah mill (p. 70)  
Kaiser plans to double plate stretcher capacity in Washington (p. 70)

## ARIZONA

**MORE COPPER PER TON**—Ray Mines division of Kennecott Copper Corp. plans a \$4,750,000 leaching plant at Hayden which will recover an additional two pounds of copper per ton of ore. Plant is to be in operation by February 1957.

**NEW PLANT TO GROW** — Capitol Foundry Division of National Malleable and Steel Castings Co., Phoenix, will enlarge its new plant within one year to meet rising product demand. Plant, which was completed early this year, now has 207,800 sq. ft. under roof.

**PLAN ZINC-LEAD MILL** — Mill site near Kingman has been tentatively picked for proposed \$2,500,000 hydrometallurgical mill recovering rare metals and zinc, lead, copper, gold, and silver, to be operated by newly reorganized Arizona-Galconda Metals, Inc.

**CEMENT PLANT PROJECT**—Newly organized Verde Valley Industries, Inc., of Phoenix buys property planned for Portland cement plant from former owner, Erle P. Halliburton. Reported sum of \$700,000 covered 1,200 acres and old copper smelter plant at Clarkdale, plus Phoenix site for cement processing plant. Original project called for piping mixture of limestone and water from Clarkdale to Phoenix, a distance of 120 miles, for final processing. New owners will reportedly carry out this plan.

**CORRUGATED BOXES**—Arizona Container Corp. starts production of corrugated boxes and containers in leased \$50,000 Phoenix plant. Founder and president of firm is Stanton Allen, formerly of Milwaukee, Wis.

**BUILD IN MESA**—A \$150,000 factory will be built in Mesa for production of canned and frozen Mexican foods by Rosarita Products, which has already acquired 3-acre tract of land.

**NEW PLANT AT WORK**—Phoenix Screw Products, Phoenix manufacturer of precision screws and special fasteners for aircraft and electronics industries, begins operations.

**INDUSTRIAL FIRE**—Planing mill and storage warehouse of Southwest Lumbermills, Inc., at Flagstaff is destroyed by fire, with damage estimated at \$1,500,000.

## CALIFORNIA

**BOARD FOR BOXES** — Container Corp. of America, New York, plans to build \$6,300,000 boxboard mill in Santa Clara, Calif., and new folding carton plant in Seattle, Wash. Board mill, which will be located next to company's present folding carton plant in Santa Clara, will supply that plant and the Seattle operation.

**50% MORE TIRES**—Expansion program costing \$6,000,000 will be undertaken by B. F. Goodrich Co. at its Los

Angeles tire manufacturing plant, increasing output by about 50%. Facilities will include two new factory buildings and new tire building and curing equipment, scheduled for completion by June 1956.

**ATOMICS DIVISION** — North American Aviation, Inc., Los Angeles, sets up separate division, Atomics International, to handle all of company's nuclear engineering and manufacturing operations. New division will occupy \$1,500,000 building in Canoga Park section of San Fernando Valley and will employ about 800 people.

Rocketdyne division has also been established, to carry on research, development, and manufacture of rocket engines, employing about 4,000 people, at new building in Canoga Park.

North American awards \$475,000 contract to Diversified Builders, Inc., of Los Angeles for construction of office building for its Propulsion Development Center, also in Canoga Park.

**MERGER** — Crown Zellerbach Corp. and Gaylor Container Corp., St. Louis, Mo., adopt merger agreement, which provides for continuing Gaylor's present management and employees but a gradual integration of forest lands and manufacturing facilities.

**NEW JERSEY SUBSIDIARY** — Oliver Tire and Rubber Co., Emeryville, acquires controlling interest in Dural Rubber Co., Flemington, N. J.

*The West On Its Way  
appears monthly in*



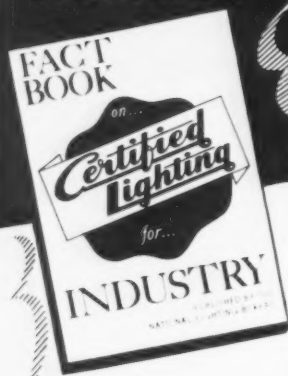
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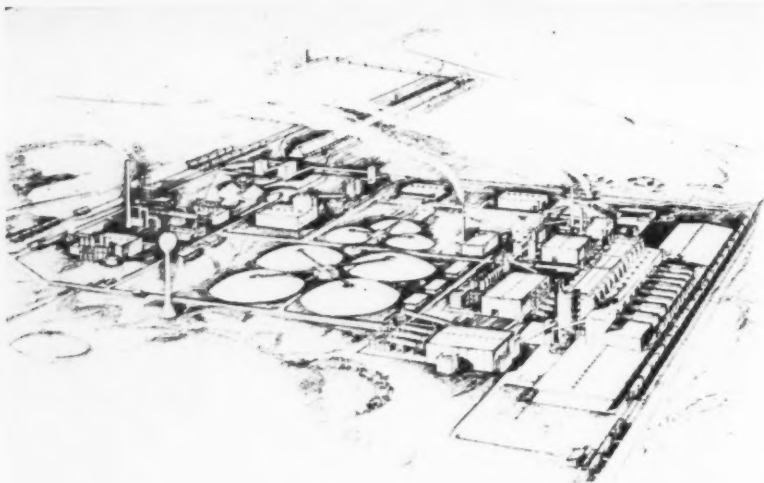
Name

Company

Address

City  State

... for more details, circle No. 66



**NEW \$18,000,000 PLANTS FOR DESERT**—Artist's sketch of concentrating and refining plants which will be built in Boron, Calif., for Pacific Coast Borax Co. Contract for engineering and construction of new facilities has been awarded to Southwestern Engineering Co. and Ford J. Thwaits Co., both of Los Angeles, on a joint venture basis. Plants, which will handle variety of ores from open-pit operation (a change-over in company's mining methods), are scheduled to be in operation by mid-1957.

**BUILD IN BERKELEY**—Ohio Chemical Pacific Co., division of Air Reduction Co., Inc., plans to build a nitrous oxide plant in West Berkeley to replace present facilities in San Francisco. New plant will use Stamford Process of manufacture, producing nitrous oxide for commercial and medical use. Project, to be completed by April 1956, will cost about \$500,000.

**SEALING EQUIPMENT**—Franklin C. Wolfe Co. is building 65,000-sq. ft. plant in Los Angeles for production of sealing devices for aircraft, electronic, chemical, and other industries. Total investment in plant and equipment will exceed \$350,000.

**LITTON GROWS IN SAN CARLOS**—First 40,000-sq. ft. building of a major expansion program at Litton Industries Power Tube division will be erected by early 1956 on a 11-acre site in San Carlos.

**NEW PLANT IN RICHMOND**—Berkeley Division of Beckman Instruments, Inc., begins construction of new \$250,000 plant in Richmond adjacent to present facility. New building will house systems engineering department, and add to manufacturing capacity. It is scheduled for completion by January.

**EKCO EXPANDS**—Office building and factory addition is under construction at Los Angeles plant of Ekco Products Co. in a \$1,250,000 expansion program which will permit consolidating in one location activities of this Chicago company's three subsidiaries in Southern California: McClintock Manufacturing Co., National Glaco Chemical Division, and Bocaroy Disappearing Clothesline Co.

**PLANT IN FULLERTON**—Moore Business Forms, Inc., Pacific Division, will build 160,000-sq. ft. plant in Fullerton, which will employ over 300 people.

**PLYWOOD PLANT IN OAKLAND**—Albrite Plywood Manufacturing Co., whose previous plant was destroyed by fire last summer, has under construction a new plywood plant in Oakland to be completed by April of next year. New \$1,000,000 plant will have a capacity of 4,500,000 ft. of plywood per month, supplied from Northern California veneer mills. Also under construction on same site is a new paint plant for Albrite, which will cost about \$50,000.

**EX-CELL-O PLANT**—Ex-Cell-O Corp. at Detroit acquires 15-acre plant site at Downey for construction of 60,000-sq. ft. manufacturing building.

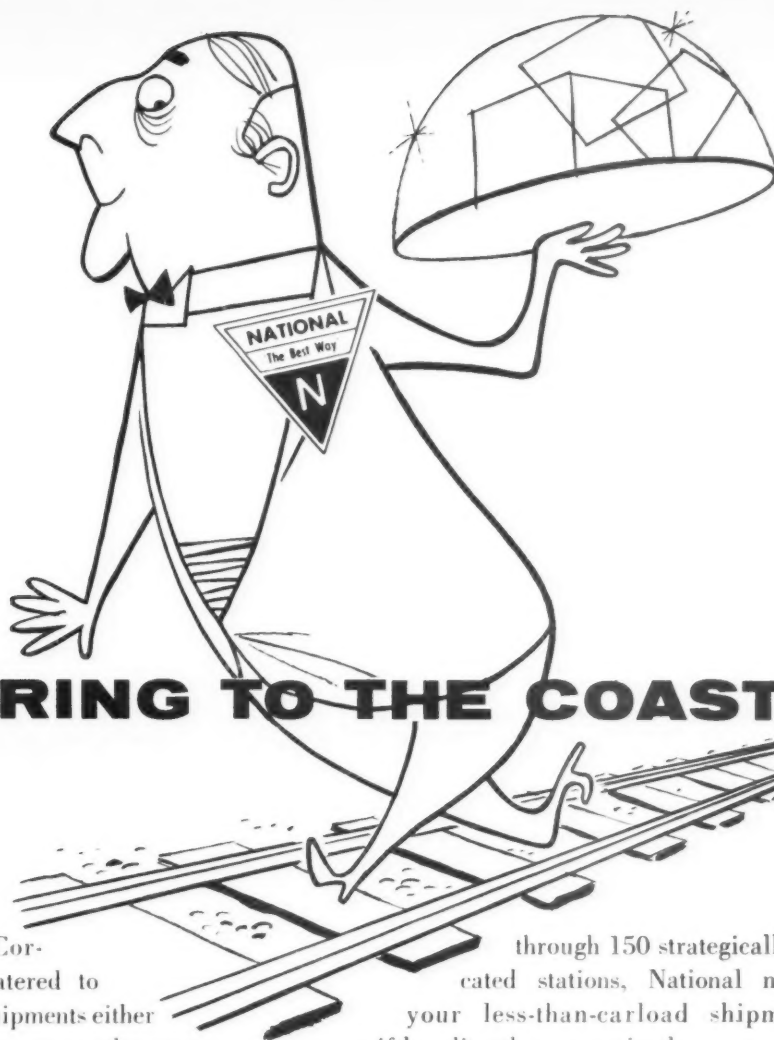
**FOILTAINER-REYNOLDS**—Foiltainer, Inc., San Gabriel, enters agreement with Reynolds Metals Co., Louisville, Ky., to operate West Coast facilities for manufacture of aluminum foil containers for Reynolds, which will market product through its own sales organization.

**NEW BATTERY PLANT**—Nic-L-Silver Battery Co. leases former Barney-Chaney charcoal factory in Stockton and remodels buildings at cost of about \$250,000 for manufacture of batteries, employing 50 people. Existing quarters will be retained for use as distribution warehouse.

**BUY FIRM IN EAST**—Weber Showcase and Fixture Co., Inc., Los Angeles, acquires factory in Grand Rapids, Mich., of Grand Rapids Store Equipment Corp., manufacturer of refrigeration equipment, steel and wood partitions, and industrial tools and equipment.

**STOCKTON PLANT**—Gravem-Ingles Baking Co. acquires 18-acre site in Stockton and begins construction of new plant, to cost over \$500,000, which will replace present facility in the city.





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**FULLER ACQUIRES TRIMVIEW** — W. P. Fuller & Co., San Francisco paint manufacturer and distributor of building products, acquires controlling interest in Trimview Metal Products, Pasadena, and newly acquired property at Covina, formerly owned by Covina Citrus Assoc., for Trimview factory and offices. Construction of new office building is under way at Covina, where production was scheduled to begin in December.

**PLANT IN CALIFORNIA**—Agile Plastic Corp. of Calif., is organized in Santa Ana, to be directed on a long-term franchise arrangement by American Agile Corp. of Maple Heights (Cleveland), Ohio. John R. Kearns is supervising new firm, which will have production facilities by early 1956, supplying standard and special plastic fabrications and moldings.

**RESEARCH FOR GARRETT**—Garrett Corp., Los Angeles, sets up new Rex division to conduct long-range research and development in field of aeronautics.

**NEW FURNITURE PLANT** — Cal/Mode Furniture Mfg. Co. is building new 30,000-sq. ft. plant in Los Angeles which will be occupied in early February 1956.

**TO OPEN SECOND FACTORY**—Mode Furniture Enterprises of Los Angeles leases factory in Los Angeles which will more than double company's manufacturing capacity when it is opened early next year.

**BOOST CAPACITY 40%**—California Doran Heat Treating Co., Los Angeles, undertakes \$250,000 facilities expansion program, which covers purchase of land, new construction, and installation of new equipment and machines.

**BUILDING RECORD**—Fifty-two percent more building permits for factories were issued in the first three months of 1955 than for corresponding period in 1954 in the 12th Federal Reserve District, which comprises seven of the eleven Western States.

Office and bank buildings showed an increase of 37% and stores and other mercantile institutions 56%.

For the first five months of 1955, over 22% of the building permit activity (by value) undertaken in the nation took place in the 12th District, although less than 12% of the nation's population is in this area.

**MARIN INDUSTRIAL DISTRICT** — Tract of land along Northwestern Pacific trackage and Highway 101 north of San Rafael is purchased for industrial development by David Seymour, Beverly Hills builder and developer. Project has backing of Marin Development Foundation, a promotional organization headed by Walter K. Kilborn.

**PIPE COMPANY SOLD**—U. S. Industries, Inc., acquires Southern Pipe & Casing Co., Azusa manufacturer of welded steel pipe for water, oil, and gas, to be operated as division of parent company.

**SEALS, LTD.**—New company to manufacture glass-seal type connectors for aircraft and electronics industries is formed in South Pasadena, with name of Seals, Ltd.

**BULK LOADER FOR STOCKTON**—Stockton Port Commission awards \$72,722 contract to Shepherd & Green for installation of rotary car dumper that will unload ore cars at rate of 750 tons per hour.

**ADD TO PLANT**—Refrigeration Engineering, Inc., will add 22,000 sq. ft. of space to its Los Angeles plant for manufacture of air conditioning and refrigeration equipment.

**COLOR TV** — Hoffman Electronics Corp. expands manufacturing facilities at its Pasadena plant permitting production of color television receivers. Avalon plant will be devoted entirely to production of black and white receivers.

**HYCON ELECTRONICS**—Hycon Manufacturing Co., Pasadena, forms new subsidiary, Hycon Electronics, Inc., to take over design, manufacture, and sale of commercial electronic test equipment for laboratory use.

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WESTERN INDUSTRY — December 1955



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of various diameters has been shipped from our Napa, California plant to run a pipe line from San Francisco to London.

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SINCLAIR PIPE LINE CO.  
INTERPROVINCIAL PIPE LINE CO.  
OKLAHOMA NATURAL GAS CO.  
PLATTE PIPE LINE CO.  
NATURAL GAS PRODUCERS, INC.  
THE MONTANA POWER COMPANY  
COLORADO INTERSTATE GAS CO.  
ARAPAHOE PIPE LINE CO.  
TRANS MOUNTAIN OIL PIPE LINE CO.  
MOUNTAIN FUEL SUPPLY CO.  
SOUTHERN UNION GAS CO.  
EL PASO NATURAL GAS CO.  
PACIFIC GAS & ELECTRIC CO.  
STANDARD OIL COMPANY OF CALIFORNIA  
UNION OIL COMPANY OF CALIFORNIA  
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**BOAT COMPANY**—Allen Boat Co. has new plant under construction at Compton, to be completed early next year, for boat building and repair.

**LACQUERS** — Spartan Lacquer Co. begins operations in new plant at Downey, manufacturing lacquers, paints, and varnishes. Company is a subsidiary of Southland Pipe and Supply, Inc.

**ELECTRONIC ASSEMBLY FIRM** — Cle-Cal Co. begins operations in Van Nuys on assembly of electrical harness and other apparatus, performed on job shop and contract basis.

**EXPANSION**—H & B American Machine Co. is moving to new building in Culver City which will double production capacity. Company manufactures aircraft components.

**MOVE TO DOWNEY** — Steelmasters Co., Inc., Los Angeles, plans to occupy new plant on 10-acre site in Downey early in 1956. Company handles hydraulic test cabinets, materials handling equipment, gas and water tanks, and also does contract metal work.

**BUILD KANSAS REFINERY**—Southwestern Engineering Co., Los Angeles, is awarded contract to build and equip platformer and unifier for Coffeyville, Kan., refinery of Co-operative Refinery Assoc.

**KENCO EXPANSION**—Kenco Manufacturing Co. doubles its Los Angeles plant area and installs new production facilities.

**RESEARCH AT McCULLOCH** — Addition to research building at Los Angeles plant of McCulloch Motors Corp. will add 45,000 sq. ft., at cost of \$135,000, housing machine shop and model shop. New equipment will include three new dynamometers for testing chain saw and aircraft target power-plants.

**REORGANIZATION** — Consolidated Vacuum Corp., Rochester, N. Y., formerly a wholly owned subsidiary of Consolidated Engineering Corp., Pasadena, merges with parent company under name of ConVac Division.

**ADD IOWA SUBSIDIARY** — Bourns Laboratories, Riverside manufacturer of precision potentiometer instruments, acquires subsidiary plant in Ames, Iowa, which will operate independently but allow faster delivery and improved customer service.

**ELECTRONICS EXPANSION** — Electronic Engineering Co. of California, Los Angeles, adds 6,300 sq. ft. of space to its present quarters and plans to start construction early next year of a new 30,000-sq. ft. plant in Santa Ana, for occupancy in February 1957.

**JET AIRLINERS ORDERED** — United Air Lines places contract with Douglas Aircraft Co. amounting to about \$175,000,000 and covering 30 DC-8 jet airliners. Deliveries will begin in May 1959. National Airlines, Miami, Fla., places order for six DC-8's.

**RYAN BUILDS** — Ryan Aeronautical Co. has underway 45,000-sq. ft. addition to its jet engine parts building in San Diego. Company recently announced that it had received a new Air Force contract which assures production of Firebee jet target drone missiles well into 1956.

**ARMY CONTRACT**—Food Machinery and Chemical Corp., San Jose, is awarded \$8,700,000 contract for armored infantry carriers.

**BUY MONROVIA FIRM**—H. K. Porter Co., Inc., Pittsburgh, Pa., acquires Carlson & Sullivan, Inc., Monrovia, manufacturers of steel rules and tapes.

**ENTER NEW FIELD**—Holmes & Narver, Inc., Los Angeles design and construction company, sets up new petrochemical division, headed by Charles B. Roen.

**EXPAND AT PALMDALE**—Northrop Aircraft, Inc., is enlarging production flight test installation at Palmdale, operated for Air Force. Facilities will be completed by March 1956.



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WESTERN INDUSTRY — December 1955



## COLORADO

**NEW FOUNDRY OPERATION**—Western Foundries begins operation of its new \$200,000 plant in Longmont.

**LIMITED, BUT STARTED** — Operations get under way to a limited degree at new Sundstrand Aviation-Denver Co. \$5,000,000 plant in Denver, built to manufacture constant speed transmissions for all types of aircraft under Air Force contracts. A division of Sundstrand Machine Tool Co., of Rockford, Ill., the firm plans a tentative payroll of more than 1,000 workers.

**GILSONITE CONTRACT AWARDED**—American Gilsonite Co., Salt Lake City, Utah, awards two contracts involving a total of \$5,000,000 for construction of Gilsonite coke and high test gasoline plant in Grand Junction. Foster Wheeler Corp. is to build coking plant, and Kaiser Engineers will construct the calcining plant.

## MONTANA

**SULFUR FROM PETROLEUM**—Montana Sulphur and Chemical Co. announces plans to build a plant to manufacture sulfur from hydrogen sulfide gases, waste products of Carter and Continental refineries in Billings. New plant will locate near Carter refinery there.

## NEVADA

**INDUSTRIAL POTENTIAL STUDIED**—Nevada individuals and service organizations assist Department of Economic Development and State Planning Board in getting under way a survey of Nevada's potential for industrial development. Survey has been termed the first step toward attracting industry to Nevada.

**GUIDED MISSILE RESEARCH**—Pioneer Industries, Inc., Reno, receives contract to assist in research and development in the field of guided missiles and electronics from Air Force office of scientific research.

## OREGON

**NEW CHIPBOARD PLANT**—Willamette Fibre & Chip Board, Inc., opens new plant near Lebanon to manufacture chipboard in various colors at the rate of 50,000-sq. ft. per day. Firm expects to operate on three-shift basis soon, employing from 80 to 100 persons.

**BUY HARDWARE FIRM**—Lorenz Co., Klamath Falls wholesale hardware dealer, is purchased by Adaco Industries, Inc., of Buffalo, N. Y., for multi-million dollar price.

**MORE GREEN VENEER**—U. S. Plywood Corp. plans to build a \$500,000 plant near Gold Beach to produce green veneer for plywood manufacture. Plans are also in progress for a plywood manufacturing plant and a sawmill at the Gold Beach site.

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**BAG PRODUCTION UNDER WAY—**  
Friedman Bag Co., Inc., of Los Angeles starts production of burlap, cotton, and mesh bags at branch plant in Portland.

**U-MILL EXPANSION**—Signing of a long-term contract to purchase output of Atlas Corp.'s Hidden Splendor Mining Co. by Vitro Uranium Corp., Salt Lake City, leads to Vitro negotiations with AEC for 70% expansion of present mill facilities.

**ALUMINUM OPERATION EXPANDED**—Kaiser Aluminum & Chemical Corp., Trentwood, plans to double strength of aluminum plate stretcher with present pull capacity of 5,000,000 lb. and add new 5,000,000 lb. stretcher, in \$1,250,000 expansion of plate facilities at the plant.

**BAG PLANT EXPANSION** — Portco Corp., Paper and Plastic division, Vancouver, completes expansion program which involved purchase of machinery and equipment of Central States Paper and Bag Co. operation in Auburn, construction of a 50,000-sq. ft. plant addition, and addition of polyethylene bags, covers, liners and sheets, waxed and treated papers, and spiral wound tubing to their line of products.

**BORDEN TO DOUBLE OUTPUT** — Chemical division of The Borden Co. will build new formaldehyde plant in Seattle. Scheduled for completion late in 1956, the plant will have capacity of over 36,000,000 lb. per year.

**NO NEW PLANT** — Boeing Airplane Co. of Seattle, according to Air Force announcement, will not build new guided missile plant in Intermountain area but will use its Wichita, Kan., plant for production of the Bomarc guided missile.

**EXPAND** — Dravo Corp. is general contractor for construction of new shaft at Intermountain Chemical Corp. soda ash mine in Green River. The 1,600-ft. shaft is expected to be completed within one year.

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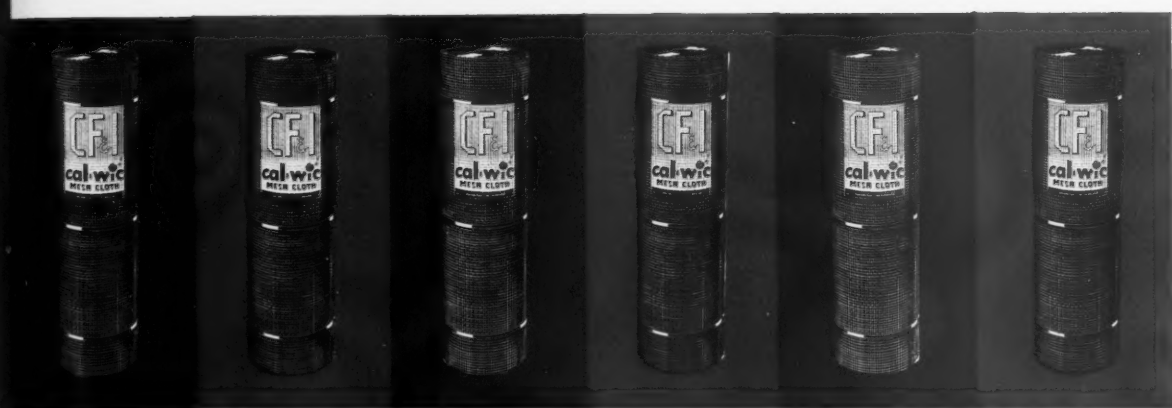
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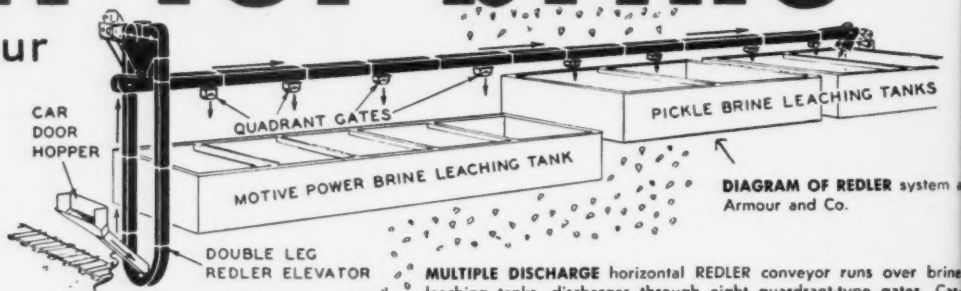


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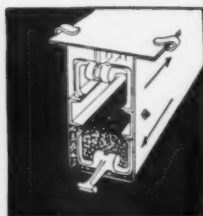
Conveyor-Elevators Move

# salt for brine

at Armour



SECTION THROUGH REDLER CONVEYOR shows how material is moved in jam-proof, sealed flow.

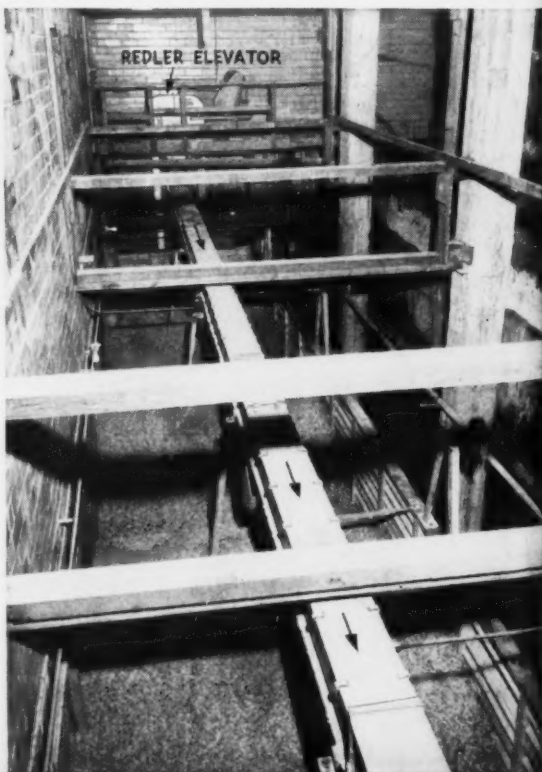


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